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of 2 Parts

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Volume 36

Number 2

APRIL 1970

Published at the Waverly Press, Inc.
Mt. Royal and Guilford Aves., Baltimore, Md. 21202
by Indiana University
under the auspices of Linguistic Society of America
American Anthropological Association
with the cooperation of
Conference on American Indian Languages

After half a century of publishing papers concerned only with American Indian languages, the International Journal of American Linguistics will also publish theoretically contributory papers concerned with languages from other parts of the world, but continue to give primary emphasis to the languages of native America. Papers for IJAL should be submitted to the Editor—C. F. Voegelin, Rawles Hall 108, Indiana University, Bloomington, Indiana 47401. Books for review, as well as reviews themselves, should be sent to the Review Editor—Eric P. Hamp, University of Chicago, Chicago, Illinois 60637. Abstracts of journal articles, as well as correspondence relating to abstracts and translations, should be directed to the Abstracts Editor—Oswald Werner, Northwestern University, Evanston, Illinois 60201.

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International Journal of American Linguistics is published quarterly at the Waverly Press, Inc., Mt. Royal and Guilford Avenues, Baltimore, Md. 21202, by Indiana University. Subscriptions (\$5.00 a year) will be received by the Business Manager, Mrs. Alice Zorn, Indiana University, Bloomington, Ind. 47401. Supplements may be ordered separately.

International Journal of American Linguistics

DEDICATED
TO THE MEMORY OF
HANS WOLFF
1920-1967

VOLUME 36 NUMBER 2
APRIL 1970

This issue of IJAL is edited by ERIC P. HAMP AND JACK BERRY

TOWARD A MANUAL OF PAPAGO GRAMMAR: SOME PHONOLOGICAL TERMS

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0. Introduction

1. Grammars by native speakers
2. The initial steps toward a Papago manual
3. A phonological terminology for Papago
4. Translation of 3

0. Our purposes in this paper are, first, to discuss briefly the value of linguistic handbooks written by persons who have native command of the languages described in them and, second, to report on our initial steps toward the production of such a handbook for Papago, a Uto-Aztecan language of the Southwest.¹

The present authors have shared the responsibility for the contents of this paper in the following way. Alvarez, a native speaker of Papago, has composed section 3, a partial account of his decisions in the development of a phonological terminology for Papago. Hale, a linguist with some experience in the study of Papago, has written sections 1 and 2. The authors worked together in editing section 3 and in producing the English version in section 4.

1. It does not seem unfair to say that a linguist who embarks on the study of a language like Spanish, to cite an arbitrary European example, is able to begin significant original work at a level which is extremely advanced by comparison with that at which a linguist embarking on the study of an American Indian language must begin. If this is true, it is because of the fact that there exist for most European languages, but for very few American Indian languages, manuals written by grammarians with native

(or essentially native) command of their subject matter. It would be irresponsible indeed for a serious student of Spanish tense and aspect, for example, not to be thoroughly familiar with Bello's excellent account;² the information contained in his work is invaluable and replete with ideas which could influence, and have in fact influenced, further research. And, in general, most significant research on European languages owes an incalculable amount to previous work by native-speaking grammarians, even where such work is, for various reasons (prescriptivist doctrine, for example), not regarded as scientifically impeccable in the context of a particular linguistic framework.

It would be incorrect to assert that there do not exist excellent accounts of American Indian languages—there are, in fact, many superb treatments, particularly of phonology and morphology, and even of certain aspects of syntax. It remains true, however, that few if any of these even remotely approach in richness the traditional grammars which exist for the better known languages.

There is a point at which the methods traditionally employed in the study of American Indian languages begin to fail. That point is basically the one at which the native speaker's intuitions assume the central role in linguistic enquiry. In fact, many linguists have come to believe that significant linguistic enquiry beyond that point is impossible unless the linguist is also a native speaker, or virtually so, of the language under investigation. It is precisely this—namely, the ample exercise of native speak-

¹ This work has been supported by the National Institutes of Mental Health (Grant MH-13390).

² Andrés Bello (with notes by Rufino J. Cuervo), *Gramática de la lengua castellana* (7th ed.) Buenos Aires (1964).

ers' intuitions—that accounts for the extreme richness of the handbooks in the class to which Bello's grammar of Spanish belongs.

With a handful of exceptions, the study of American Indian languages in the United States has been undertaken by professional linguists who have not been native speakers of the languages they have studied. They have worked with native speaking informants, to be sure, but all too often, the role of the informant has been reduced to that of producing utterances and free translations.³ A procedure of this sort is not entirely unsuccessful where the native speaker's active introspection is not crucial—e.g., in phonology and certain aspects of morphology. Beyond these areas, however, discovery and understanding on the part of the linguist are largely accidental unless the native speaker's knowledge is directly and systematically consulted. It is our relative failure in this regard that accounts for the unfavorable comparison, in terms of richness, of American Indianist grammars to European ones.

It might be well at this point to illustrate the central point of these remarks with a hypothetical example. Imagine a linguist who is not a native speaker of an Indo-European language but who is engaged in the study of Spanish tense and aspect. He is confronted with two apparent perfective verb forms, the so-called preterite and the so-called present perfect. He would, of course, have little difficulty in determining the morphological make-up of these forms, in a strictly classificatory sense—he would be able to assign labels of some sort to each of the morphemes which enter into the two constructions and identify the morphemes when they recurred in primary linguistic data. Nor would he have great difficulty in determining that the two constructions differ

in meaning, and even that they are both in some sense perfective. These facts could probably be determined in the course of traditional informant work in which the informant's involvement did not extend beyond that of producing sentences, translating them, and making judgments as to sameness and difference of meaning. It is extremely unlikely, however, that there is any direct connection between these methods of field-work and the discovery which is crucial to the understanding of the Spanish perfective forms—namely, the discovery of the essential semantic difference between the two. In order to advance beyond the classificatory stage in the analysis of the Spanish tense-aspect systems, it is necessary to know at least the following, to paraphrase Bello (p. 222): "In comparing the two sentences *Roma se hizo señora del mundo* 'Rome became mistress of the world' and *La Inglaterra se ha hecho señora del mar* 'England has become mistress of the sea,' one perceives clearly the distinction between the preterite and the ante-present [present perfect]. In the second sentence, it is implied that the dominion over the sea still continues, while in the first the dominion over the world is represented as a thing passed. The compound form, therefore, relates to something which still exists. . . . One says that a person *ha muerto* 'has died' when we still have vestiges of the deceased—when those to whom we speak believe that the person still lives. In one word, the verb entails a relationship to the present. . . ." The information contained in this passage might suggest to our hypothetical non-Indo-European linguist that he should investigate the possibility that the proper analysis of the Spanish perfective forms is one according to which the present perfect is a combination of present tense and the perfective aspect, while the preterite is the perfective aspect alone.⁴

³ For an interesting and accurate comment on the traditional role of informants in American Indian linguistics, see the second half of footnote 4 in C. F. and F. M. Voegelin, *Hopi /ʔas/*, IJAL 35. 192-202 (1969).

⁴ This, in turn, suggests the possibility that the perfective auxiliary *haber* and the preterite ending are one and the same morpheme, leading the linguist to seek confirming evidence—e.g., some situation in which obligatory rules of morphology

What is important in the context of the present discussion is that, without this comment, he may never have perceived the relevant semantic distinction and, therefore, may have remained forever incapable of saying anything deeper about the forms than that they are distinct and refer to perfection.

It does not seem incorrect to say that, at the present time, this describes our position in the study of American Indian languages pretty accurately. It is cause for celebration when even an elementary semantic distinction like the Spanish one above comes to be understood in the course of conventional field work. It is important not to be misled by the fact that once a subtle semantic distinction is understood it is possible to construct a test which will confirm, or corroborate, the newly acquired understanding. Such tests, constructed after the fact, cannot be confused with discovery procedures. The fact remains that we come to understand a subtle semantic distinction, if at all, either by accident—a sudden flash of insight, as it were—or through an insightful remark on the part of a native speaker.

What we are implying here is that research on the better known languages of the world is able to proceed from a large body of incisive linguistic commentary by native speakers—in particular, commentary directed at the semantic contribution of linguistic forms. At the point at which most current grammatical work on European languages begins, it is possible to take an extremely large body of essentially intuition-based data for granted. By contrast, American Indian linguistics, in the best of cases, is able to proceed from a reasonably good foundation in phonology and morphology. But it can only view the sort of data which Indo-Europeanists take for granted as a distant goal to be achieved eventually, and

(sequence of tenses, or the like) result in the circumstance that the perfective aspect can only be represented by a form of haber (as is perhaps the case in *dudé de que lo HUBIERAN matado I doubted that they killed (or had killed) him.*).

largely by accident, unless we radically shift our methods of operation.

Assuming that this is a reasonable statement of the situation, we ask what steps might be taken to enable American Indian linguistics to secure the data-base which is necessary if it is to advance in interesting and significant ways. The answer to this question is obvious. It is embodied in the virtual truism that the discoveries which a non-native-speaking linguist can only regard as miraculous are, in the vast majority of cases, bits of knowledge of the most mundane sort to a native speaker.

In short, we must make every effort to engage speakers of American Indian languages in linguistic work on their own languages, in the work of writing grammars. One conceivable way in which this might begin is in fact the subject of this paper—namely, the preparation, by native speakers, of manuals like those which exist for so many European languages and which concentrate primarily on problems whose clarification depends critically on a native speaker's linguistic intuitions.

It is appropriate at this point to exemplify for an American Indian language the kind of material, beyond basic phonology and morphology, which we feel should form a principal focus in a manual of the sort we are considering. This discussion will be largely anticipatory, since we are not actually at that stage in our work on Papago—nonetheless, we have rather clear notions about the nature of material which is needed.

Consider the following pair of sentences in Papago:

- (1) m-at o ʃa t-júks, nt pi ʔam hú o hí:.
- (2) (ku-)tp o ʃa t-júks, nt pi ʔam hú o hí:.

If we get rain, I won't go.

We draw attention to the fact that these two sentences differ, in their surface representations, only in the form of the auxiliary in the first clause—that is to say, in the first word of the protasis. In (1), the protasis

is introduced by the general subordinator /m/, and the auxiliary (/at/) is in the mood which can be said to be in some sense 'unmarked'. In (2), by contrast, the protasis is introduced, optionally, by the element /ku-/ (normally associated with obviative conjoining or topic change).⁵ The auxiliary itself (/tp/) is in a mood distinct from that of sentence (1), a mood characterized morphologically by the ending /-tp/. Both sentences are hypothetical conditionals—as in all hypothetical conditionals, both clauses are morphologically future (i.e., both contain the future particle /o/), and the protasis contains the particle /ša/ *if*. Both are appropriately translated into English as "If we get rain, I won't go." But they are different in meaning—quite different in fact.

The remarks we have just made, while true from a purely observational point of view fail entirely even to suggest the information which is essential to further research on these conditional forms and on the semantics of the mood in /-tp/. Nonetheless, little more than these elementary remarks can be made if methods of research are limited to elicitation of utterances and translations. In the case under consideration, what we really need to know is how the two sentences (1) and (2) differ in meaning. There are two ways to get this information. We can simply persist in accumulating data in the hope that the distinction will, in some way or other, reveal itself—the problem with this being that it may never reveal itself, as it did not in the work of Hale (the present co-author who is not a speaker of Papago). Alternatively, we can obtain some commentary by a native speaker aimed specifically at revealing the semantic difference. The following, composed by Alvarez, is such a commentary on (1) and (2). We quote both the original Papago version and an English translation (in

square brackets):

M ?ant o há?icu ?em-?á:gi ?ab ha-?ámjed
?ídam gó:k ñé?okí wáwñim. M ?ia hab
cú?ig

(1) mat o ša t-júkš, nt pi ?am hú o hí:.

(2) tp o ša t-júkš, nt pi ?am hú o hí:.

?Idam ?o hab hía káidag mo wé:sijc ?e-wépo
má:ma há:s wuđ ?á:ga. K ?éda hab má:s
mo pi hab cú?ig. Heg kéka: mo ?í:da m ?an
wé:peg wáwañ hab wuđ ?á:ga "mat o ša
jú: sí?alim ?o bá?ic sí?alim" kuc pi má:c
mas hú o jú:, heg héka: mo pi ?an hú ha
céwgi, kuc hab aš cem ?élid mat o jú:.
Kc ?í:da héma ñé?okí wáwñim hab hí
má:s mo ša s-má:ma ?í:da mo héda: hab
?i káij mat o jú:, heg héka: mo ?an ñéid mo
s-céwgi kc heg héka: hab ?élid mat o jú:.

[I will discuss the following two sentences,
to wit

(1) mat o ša t-júkš, nt pi ?am hú o hí:.

(2) tp o ša t-júkš, nt pi ?am hú o hí:.

If we get rain, I won't go.

These sound as if they mean the same thing. But it is evident that they do not. For the first sentence means 'if it should rain tomorrow or the next day' and we do not know whether it will rain (at all), because there are no clouds; we merely entertain the possibility that it might rain. In the other sentence, by contrast, it appears that the speaker half knows that it will rain because he sees that there are clouds and, for that reason, thinks it will rain.]

This remark, and similar ones suggested by it, have led to the following understanding of the opposition. In sentence (2), there is an assumption that it will rain—"Assuming that it rains, I will not go." Its use is, accordingly, inappropriate in circumstances under which there is no basis for making an assumption. In sentence (1), there is no assumption either way concerning the possibility of rain; rather, rain is simply stated as a condition for the assertion embodied in the apodosis—"Rain is a condition under which I will not go."

⁵ For some remarks on Papago morphology and the auxiliary, see footnotes 3 and 6 in Kenneth Hale, Papago /čim/, IJAL 35.203-12 (1969).

The information contained in Alvarez's comment is of an entirely different order from that contained in the elementary list of morphological remarks begun earlier. It is not at all clear how this new material is to be accommodated in the context of a generative grammar of Papago.⁶ And this, in fact, is precisely where its interest lies—it is this kind of material which provides a basis for further research which can ultimately lead to a significant advancement of linguistic theory; an account of Papago conditionals and modality which fails to

address itself to such material is of minimal theoretical interest.

Be this as it may, we suggest that commentary of this sort, appropriately extended and systematically organized, should form the major part of any serious manual of Papago grammar. More strongly, we suggest that if this preliminary step is not taken, the immensely rich and complex linguistic system which Papago represents will never assume its proper place in the growing body of knowledge on human language.

⁶ Like certain other modality elements in Papago, the mood represented by the auxiliary suffix /-tp/ is often semantically 'speaker-related', in the sense that it refers to a mental circumstance on the part of the speaker of the sentence—hence it is often appropriately translated as 'I imagine, I assume,' as in /húan ?atp cikpan/ *I imagine/assume John is working*. Contrast /húan ?o cikpan/ *John is working*, with the auxiliary /?o/, essentially 'unmarked' in terms of mood.

As does the protasis of sentence (2) in Alvarez's remark, the simple sentence /húan ?atp cikpan/ implies rather strongly that the speaker has some basis for making an assumption—/húan ?atp cikpan, mo hab káij matš o cikp/ *I assume John is working, as he said he was going to*. Alvarez argues in addition that the semantic distinction between sentences (1) and (2) is paralleled by 'self-interrogatives' like:

(a) s hú jú:.

(b) tp hú jú:.

I wonder if it rained.

He points out that (b) indicates that the speaker has direct evidence (wet ground, say) which leads him to suspect strongly that rain has actually fallen; in (a), the least marked self-interrogative, there is no such implication. And, in general, he is able in the majority of cases to detect a rather consistent semantic contribution of the mood in /-tp/.

Some preliminary suggestions for the generative treatment of certain ones of these semantically complex modality elements are made by Hale in his remarks on the relevance of Papago /čim/ to universal considerations in language—prepublication copy of Papago /čim/, MIT ms., 1968. One of the possibilities he discusses there is that these elements are syntactically complex in a way which corresponds to their semantic complexity—i.e., the possibility that they reflect more abstract structures involving superordinate verbs.

The example just cited represents a particular, but very typical, situation: we have two grammatical sentences whose surface structures are minimally different. The obvious initial task is to determine the corresponding difference in meaning, if any. This is, however, not the only kind of data relevant and essential to linguistic enquiry. Thus, a manual of the type we are discussing should include commentary on the total range of situations in which a native speaker's intuitions are crucial—ambiguities, paraphrase relationships, and so forth. One type of data, in particular, is extremely important—this is what Ščerba referred to as 'negative linguistic material'.⁷ The role of ungrammatical sentences in linguistic research is now, as it was not in Ščerba's time, fully recognized. We conclude this section with another example of the type of linguistic discussion which we feel is essential to further research on Papago. In this instance, the problem relates to a distinction between active and stative transitive sentences and an ungrammatical sentence which results if a certain inanimate noun is used as an agent in the active transitive type. As before, we give both the original Papago version and an English trans-

⁷ L. V. Ščerba, On the Three-fold Manifestation of Linguistic Phenomena and on the Experimentation in Linguistics, *Izvestija AN SSR, Otd. Obščestvennyx nauk* (translated by Morris Halle MIT ms., 1966, from the version in V. A. Zvegintsev, *Istorija Jazykoznanija XIX i XX, Part II*, pp. 301–12, Moscow, 1960) (1931).

lation:

?Idam ?ant ?am o ha-?á?aga gí?ikk ñé?okí wáwpñim. M ?ia hab cú?ig

- (1) wákial ?o sósbid g wísilo.
- (2) wákial ?o so:bide g wísilo.
- (3) *kí: ?o sósbid g héwel.
- (4) kí: ?o só:bide g héwel.

Kunt ?idam wé:peg ?am o ha-?á?aga ñé?okí wáwpñim (1, 2). ?Í:da m ?an wé:peg wáwpñim ?o hab wuð ?á:ga mo g wákial g wísilo sósbid kc ?atp héms ?an ?á?ai si mémða kc ?an cem tá:gio kékiwup g wísilo kc aş hab-a pi ?e-náko mas o kú:. Kc ?í:da héma ñé?okí wáwpñim (2) hab wuð a ?ép ?á:ga mo g wákial g wísilo sósbid kc aş hab-a hí kú: ?o kéşwua kc ?an tá:gio ké:k, ?atp héms ?ab kólhai ?i cú:lk ?ab.

Kc ?í:da héma ñé?okí wáwpñim (3) hab wuð ?ép-hi ?á:ga mo g kí: g héwel sósbid kc aş hab-a pi ?áp hab káidag, heg hékaj mo hab káidag matp wuð dóakam g kí: kc ?in háş mémða c sósbid g héwel, k ?éða g kí: mo cem hékid hab aş ?i cú?ig, kc heg hékaj pi ?áp hab káidag. Kc ?í:da m ?ia wuð ?i si ha-?óijkam (4) hab wuð ?ép-hi ?á:ga mo hab-á?ap g kí: g héwel sósbid, kc aş hab-a hí s-?áp hab káidag, heg hékaj mo ?am aş ?i ké:k c pi ?an hú háş ?i hóik?e kc aş hab-a hí ?an tá:gio g héwel.

[I will discuss these four sentences—i.e.,

- (1) wákial ?o sósbid g wísilo.
The cowboy is blocking the calf.
- (2) wákial ?o só:bide g wísilo.
The cowboy has the calf blocked.
- (3) *kí: ?o sósbid g héwel.
The house is blocking the wind.
- (4) kí: ?o só:bide g héwel.
The house has the wind blocked.

I will first discuss sentences (1) and (2). The first means that the cowboy is blocking the calf and, perhaps, he is running back and forth trying to get in its way, but he cannot trap it. Sentence (2) also means that the cowboy is blocking the calf, but in this case he has trapped it or stopped it and is in its way—perhaps, at a corner of the corral.

The third sentence means that the house

is blocking the wind; but it does not sound right, because it sounds as if the house were a living thing running about and blocking the wind. But a house is stationary; for that reason, the sentence sounds incorrect. The final sentence, (4), also means that the house is blocking the wind, but, in this case, the sentence sounds good; for the house is merely standing there, without moving about, and it is in the way of the wind.]

2. In this section, we will describe very briefly the procedure we have adopted in working toward a handbook for the Papago language.

The procedure is simply this: we work systematically through the various sub-fields of linguistics, starting with phonology, and relate the methodology and theory of current linguistics specifically to problems in Papago. After each session—we have two three-hour sessions per week—Alvarez composes an essay, in Papago, and in a style which he feels will be readily understood by other Papago speakers. Each essay is constructed with the specific aim of revealing the salient facts about Papago which have emerged in the course of our theoretical and descriptive discussions together. A secondary, but important aim of these essays is to explicate the key concepts and methods in current linguistic practice. After each essay is composed, we work together in editing it, and improving it where required. After a coherent collection of essays is assembled, we work together on an English translation which will make the material available to a wider audience.

We proceed in this manner in order to enable Alvarez to acquire, in a systematic way, a knowledge of linguistic methodology while at the same time actually producing a linguistic document. It is upon his shoulders, after all, that the major responsibility for the theoretically most significant portions of the handbook will ultimately fall.

Our decision that the material be written in Papago is motivated by a variety of considerations. It is hoped that this material

will be used in discussions among speakers of Papago and even that a tradition of linguistic commentary can be begun among members of the Papago community who might acquire an interest in the study of their language. Furthermore, if the material is composed in Papago, there is a certain freedom which is achieved—in particular, a freedom from the constraints imposed by the technical vocabulary in English, a terminology which, in many instances, is unrevealing and even counter-suggestive. Thus, while our theoretical and methodological discussions make use of the traditional linguistic vocabulary in English, we make every effort to ensure that Alvarez is free to discuss the Papago material in his own way—specifically, that he is able to coin a terminology which is both accurate and suggestive. This practice has yielded valuable results—the technical vocabulary which Alvarez has developed is, in fact, more suggestive than the English one, in many cases. His terminology in relation to the elusive tensivity feature associated with stop consonants, for example, is particularly incisive—he has noticed that the tense stops, when whispered, are characterized by a noise burst resembling high pitch; in his words, they are ‘sharp sounds’. This is highly suggestive—it may well prove true that the mechanisms involved in the production of tense stops in Papago are, in part, the same ones involved in producing high tone.

Our systematic work to-date has been primarily in phonology, except for a variety of anticipatory excursions into syntax and semantics (e.g., the comments quoted in 1 above). We devote the next two sections to a partial explication of the decisions which Alvarez made in developing a phonological terminology for Papago. 3 is the original Papago version, and 4 is the corresponding English version.

3. Matt hékid ?ab ?i sónwuic ?í:da cíkpan ?ab ?ámjed g ?ó?odham ñé?okí

ha-káidag kuc ?am t-?á?aga mas háseu si s-?áp ?am hab o ?e-céi ?am ha-wé:hejed ?ídam ná:nko má:s cé?idag c ha-káidag ?íd ?ámjed ?ó?odham ha-ñé?okí. Kut ?ídam ?am a hékaj ?i wúwha káidag c cé?idag mac cem hékid ha-hékaj táš ?óidam. Kc ?éda hab má:s mattp o táccud mat ?ab há?icu o béi g ?ó?odham ?íd ?ámjed ñé?okí máscama, kutt hémho o a hékaj ?í:da ñé?okí mo cem hékid ?e-hékaj ?am ?ó?odham ha-tá:gio, mat heg ?ámjed o s-?ámicudk o ká:. Kutt ?íd ?am ?i wú:šad káidag mat ?íd wé:s wuđ o ha-wé:hejedkamk ?ídam ná:nko má:s cé?idag c káidag. Kc hab ?ép má:s mo ?í:da káidag ?íd ?áb wuđ ?ámjedkam maš wuđ ká:, kc hab wuđ ?á:ga mat háseu ?an háš o ?i káijcid mt o ká:. Hab mášma mat hébai ?am há?icu háš o ?e-jú: t ?am o ?e-hémapai g hémajkam k há?i ?im o ñéñokad c há?i ?im o ñé?ed c há?i ?im o hí:nkad t héma ?am o ha-ká:kc hab o céi “?am ?o hía káidag g hémajkam.” Kc ?í:da héma maš wuđ cé?idag ?íd ?áb wuđ ?ép-hi ?ámjedkam maš wuđ cé?ě ke pi ?ab hú ?e-?áb ?e-?úl ?am ha-wé:hejed ?ídam ná:nko má:s káidag, hég hékaj mo pi hab wuđ ?á:ga mas há?icu o ?e-ká:, kc aš hab-a hab wuđ ?á:ga mamt hébai há?icu ?am hab o céi, kc ?é:p mo hab wuđ ?á:ga mat hébai ?am há?i o ?e-wé:m cíkpanad o g bó:l cem hékid o ?e-wé:m cícwid kut ?am há?icu wuđ o háš ?á:gak t cem hékid o hékajk hégam mat ?am o ?e-wé:m cícwid. Kut hégai mat o ha-wé:m cícwid hab o céi ?ab ?e-kí: ?ab “hég o wuđ si ha-cé?idag hégam mañ ?am ha-wé:m cícwí.”

Kut ?ámjed ?íd ?am ?i ?ép wú:š mac hab-á?ap si hékaj ?am ha-wé:hejed ?ídam ná:nko má:s káidag ?í:da maš wuđ ?í:bhei. Kuc ?éda ?í:da ?í:bhei hab-á?ap cem hédai hékaj, pi ?á:cim a?i ?ó?odham kc aš hab-a cem hédai. Kutt hég hékaj ?íd ?ép hékaj ?am ha-wé:hejed ?ídam ná:nko má:s káidag, hég hékaj mo wé:s ?ídam há?icu hab cé?idag ?e-hékaj ?í:da ?í:bhei mamt hékid ?am o si ?í:bhe t ?am o wú:š ?em-cíñ ?ámjed. Kc hab ?ép má:s mo ?í:da ?í:bhei wé:sko ?e-hékaj ?am ha-?é?éda ?ídam gáwul má:s

káidag. Hab másmá—ʔi:bhei só:bida, eñí kú:piʔoka ʔi:bhei, s-hípsunam ʔi:bhei, ke háʔi ʔé:p.

Kutt hé muc ʔídam ʔam háhawa ʔép ha-ʔáʔaga ʔi:bhei só:bida ke eñí kú:piʔoka ʔi:bhei, matt ʔam ʔi ha-wúwhas mat wuḍ o ha-wé:hejedkamk ʔídam gáwul má:s káidag matt gó:kpa ʔi ha-gáwulkai. Kutt hé muc ʔid wé:peg ʔam o ʔáʔaga ʔi:bhei só:bida k ʔámjed ʔam o ʔi kú:gídk ʔid ʔam háhawa ʔép o ʔáʔaga eñí kú:piʔoka ʔi:bhei. M ʔamtp hú aʔi s-cégíto mañ a hab káij mattp o táccud mat ʔab o háʔicu búi g ʔóʔodham ʔid ʔámjed níʔokí máscama, kutt hé mho o a hékaj g níʔokí mat o s-ʔami-cudk ká:. Kuc hég hékaj pi ʔam hú ʔi si s-hó:hoʔid maes si mílgankaj ʔam hab o cem eúi háʔicu ʔam ʔóʔodhamkaj hég hékaj mo hébaicuje ʔam a gáwul há s wuḍ ʔá:ga ke ʔéda hébaicuje háʔicu ʔép si s-ʔáʔapʔet. M ʔia hab má:s ʔam tá:gio ʔi:da consonant, sá: ʔo cúʔig matt ʔid o hékaj mo cem hédaí hékaj, kut aš hab-a pi o ʔamicudad g ʔóʔodham hémajkam mat cem mílgankaj o ʔe-hékaj ʔam ʔóʔodhamkaj hég hékaj mat hab wuḍ o ʔá:gak wé:m-káidag k ʔéda ʔam ʔóʔodham wúí hab wuḍ ʔá:ga mo wé:s ʔe-wépo káidag ʔídam ná:nko má:s káidag, k ʔéda pi hab má:s hég hékaj mo múʔi ná:nko má:s káidag ʔam hab cúʔig ʔid ʔéda ʔóʔodham ha-níʔokí. Kut hég hékaj ʔid ʔam ʔi wú:s ʔi:bhei só:bida mat ʔid o hékaj ʔam ha-wé:hejed ʔídam káidag. Kc ʔi:da só:bida ʔid ʔab wuḍ ʔámjedkam maš wuḍ só:bid mat háʔicu ʔan tá:gio hab o ʔe-jú: háʔicu ke hab-áʔap si ʔe-hékaj ʔi:da táš ʔóidam ʔam ha-tá:gio ʔídam mo háíwañga ke ʔídam mo káka-wyuga ke ʔídam ʔé:p mo g sí:kí ha-wípia. Hé g hékaj mat hédaí o ʔi cem ha-sóšbidad g háʔicu dóakam kut hé mho o a héma dáʔiwuš ʔan hásko. Hé g hékaj mo pi hab wuḍ ʔá:ga ʔi:da só:bid mas s-ʔap o ha-kú: o ha-kéšwua kut hé g hékaj ʔab si ʔáb ʔe-ʔúl ʔi:da só:bida ʔam háʔi ha-wé:hejed ʔídam ʔóʔodham níʔokí ha-káidag. Hé g hékaj mo wuḍ ʔídam eñí c níʔéñ mo ʔan hásko ʔe-gégewššap háʔas hú ʔal ʔi ke ʔan hásko

hab ʔi ʔép ʔe-wúa ke wuḍ ʔídam c ʔan sóšbid g ʔi:bhei. Kutt hé g kékaj hab ʔid hékaj só:bida.

Kutt ʔámjed ʔam háhawa ʔép ʔi ha-gáwulkai gíʔikpa ʔídam ʔi:bhei só:bida. Kut húmukt ʔam ʔi wúwhua mo hab cúʔig mo ʔan haʔicu kúkpa g ʔi:bhei. M ʔia hab cúʔig—/p, t, c, k; b, d, ḍ, j, g/. Kutt ʔam hab ʔi eúi matt ʔid o hékaj kúkpadam ʔam ha-wé:hejed ʔídam húmukt káidag. Kc ʔi:da kúkpadam ʔid ʔab wuḍ ʔámjedkam maš wuḍ kú:p mo hab-áʔap si hékaj g ʔóʔodham táš ʔóidam mat hébai g ʔe-púalt ʔab o ʔi kú:, ʔo g kólhai kí:jig ʔab o ʔi kú:, ʔo g sú:dagí híhij ʔan o ʔi kú:piʔo ʔo kú:. Kc ʔé:p mo múʔijc wuḍ wápgadam g ʔóʔodham ke hab ʔe-wúa c kúkpa g sú:dagí. Kutt heg hékaj ʔid ʔam ʔi wú:šad kúkpadam mat ʔid wuḍ o ha-wé:hejedkamk ʔídam húmukt káidag. Heg kékaj mo g eñí c níʔéñ ʔan kúkpa g ʔi:bhei, kutt heg hékaj hab ha-cé:c ʔídam káidag ʔi:bhei kúkpadam.

Kc hab ʔép má:s mo-kí ʔam haʔicu ʔép káidag ʔam ha-ʔéʔeda ʔídam húmukt káidag mac hab ha-ʔáʔaga ʔi:bhei kúkpadam. Kuc hé g ʔam háhawa ʔép ʔáʔagahim t hab másmá ʔam ʔe-tášogí mo-kí háʔi hab káidag mo ʔid ʔam wóʔó /h/ ha-báʔic. Kutt ʔámjed ʔídam ʔam háhawa ʔi ha-wépenec ʔídam mo cem ʔálo ʔe-wépo káidag. M ʔia hab cúʔig—/p, b/, /t, ḍ/, /c, j/, /k, g/. Kc aš hab-a hab ʔép má:s mat hékid pi wé:peg o wó:pkad ʔídam ʔi:bhei kúkpadam k ʔam aš tášo mo héma g ʔi:bhei ʔam ʔal ha-wúškʔe báʔic ke g héma pi ʔam hú ha-wúškʔe mat hékid ʔam hab o ʔe-céi. Kutt hému ʔan o ha-ʔóʔoha ʔídam mo hab káidag mo g ʔi:bhei ʔam ʔal ha-wúškʔe ha-báʔic—/p, t, c, k/. Kc ʔídam háʔi pi hab cúʔig—/b, d, ḍ, j, g/. Kutt ʔam ʔép o ʔem-cé:gí mo has másmá ʔam aš tášo mo g ʔi:bhei ʔam ʔal ha-wúškʔe mat pi wé:peg o wó:pkad ʔídam /p t c k/. M ʔia hab cúʔig—/ʔáp, ʔáb/; /ʔi:ta, ʔi:da/; /kí:c, kí:j/; /wó:k, wó:g/. Kc aš hab-a hab ʔép má:s mat hékid wé:peg o wó:pkad ʔídam ʔi:bhei kúkpadam kut pi ʔam hú o ha-wú:šañid g ʔi:bhei ʔam wé:s ha-báʔic ʔídam ʔi:bhei

kúkpadam. Kc aş hab-a ?éda gawul káidag. Kc hékaj pi háspk wuḍ ?i ?í:da mo g ?í:bhei ?am ?al ha-wúšk?e ha-bá?ic kc ha-gá-wulkaje. Kuc ?íd ?am háhawa ?ép ?á?aga-him mas háscu wuḍ c ha-gáwulkaje mat hékid wé:peg o wó:pkad. Hab másmá m ?ia ?ídam m ?ia ?e-wépnag—/pí:s, bí:s/; /tái, dáí/; /cí:wa, jí:wa/; /kái, gái/. Kut hab másmá?am ?ép ?e-tásogí mo-kí ?am si ?al kóp?e mat hékid hab héma o ?e-céi ?ídam káidag. Kutt ?am háhawa gó:k ?i ?ép ha-wépec ?ídam mo cem ?álo ?e-wépo káidag, ?ídam /k, g/. Kuc ?am hab ha-céc?ehim s-júpij, kut hab másmá ?am ?ép ?e-tásogí mo-kí héma s-káidam kóp?e c héma pi káidam. Kc aş hab-a pi hab másmá s-káidam kóp?e mas aş cem héḍai o ká:. Kc aş hab-a hab másmá mat s-júpij hab o ?e-céi kc ?é:p mat ?íd ?am ?ép ?e-tásogí mo héma si ?al s-?ájim ?am kóp?e kc héma pi hab másmá s-?ájim. Kut ?ídam ?am a hékaj ?i ?ép wúwha maş há?icu wuḍ s-mú?ukam c s-hé:bagim kc ?é:p mo hab-á?ap si hékaj g ?ó?odham cem hékid. Kutt heg hékaj ?am aş ?ép ?áp?et matt ?ídam o ha-hékaj ?am ha-wé:hejed ?ídam ?í:bhei kúkpadam, heg hékaj mo ?í:da s-mú?ukam hab wuḍ ?á:ga ?am ?ó?odham ha-wúí mat há?icu o s-mú?ukk hab másmá mo g sí:şpakud ?o g náwaş kc aş hab-a mat hékid ?am héma o si híhin şa s-?ájim t hémho hab o a céi héma ?am ká:kc “hég ?at si s-mú?ukam híhin.” Kc hébai héma aş o şa s-tá:hadagk c hab o céi “cem ?álo ?at ñ-cú?akaḍ g m-híhinkí.” Kutt heg hékaj ?íd hékaj ?am wé:hejed ?í:da mo si ?al s-?ájim ?am kóp?e. Kc ?í:da héma maş wuḍ s-hé:bagim hab wuḍ ?ép-hi ?á:ga mat hébai héma si s-bágam o ñéokad c ?am o ?i ?áp?et k ?am o jí:wa m-wúí k háhawa ?ép si s-?áp o ñéokad hab másmá mo wuḍ si ñé?okij, t hab o céi ?í:da mat ?am wúí jí:wa “?i ?at jí:wa k háhawa si s-hé:bagim ñéok,” ?o héma g káwyu o césajid c o ?i géi k aş hab-a ?am aş s-móík jéwedc ?ed o géi k hab o céi ?ab ?e-kí: ?ab “?i ?ant géi ?ab káwyut ?áb k aş hab-a aş s-hé:bagim ?am géi hég hékaj mo s-móík g jéwed.” Kut hég

hékaj ?ab ?ép si ?áb ?e-?úl ?í:da s-hé:bagim ?am ha-wé:hejed ?ídam mo pi mú?ukam ?am hú kóp?e, kutt hékaj ?am ?i ?ép ha-gáwulkai ?ídam ?í:bhei kúkpadam mo wuḍ húmukt. Kutt gí?ikk ?am ?i ha-wúwhas mat wuḍ o s-mú?ukam káidagk, k hétasp ?am ?i ?ép ha-wúwhas mat wuḍ o s-hé:bagim káidagk. M ?ia hab cú?ig, ?ídam ?o wuḍ s-mú?ukam káidag /p, t, c, k/, kc ?ídam wuḍ s-hé:bagim káidag /b, d, ḍ, j, g/.

Kutt ?ámjed ?ídam ?am háhawa ?ép ?i ha-wúwhas gí?ikk káidag. M ?ia hab cú?ig —/m, n, ñ, ŋ/. ?Am ?o hía şa táşo mat háş o ?e-cé:c ?ídam káidag heg hékaj mat o ?e-kú: g ?í:bhei ?ab cín ?ab ?o ?am bá?itk ?ed k ?im hú hab o wú:ş dá:k ?éd. K s-ma:c g ?ó?odham ?í:da hég hékaj mat hébai héma o ñéokad t ?i hú hab aş o şa wú:şañid g ñé?okij dá:kaj ?éd t héma o ká: kc hémho hab o a céi “hég ?o ge ?e-dá:k ?éd ñéok” ?o hébai héma (wá:m g ?áli hab wuḍ si cé?idag) mat g háíwañ o ñéi mat ?ab o si ?í:bheiwua ?e-dá:k ?éd t hab o céi “hégai háíwañ ?at ?ab si ?í:bheiwua ?e-dá:k ?éd.” Kc hékaj ?am aş táşo, mat háş o ?e-?á?agad ?ídam gí?ikk káidag. Kutt hég hékaj hab ha-cé-c dá:k ?éd ?í:bhei.

Kutt ?ámjed ?ídam ?am háhawa ?ép ha-?á?aga gó:k káidag (m ?ia hab cú?ig—/s, ş/) mas háscu si s-?áp o ?e-hékaj ?am ha-wé:hejed. Kut ?íd ?am ?i wú:ş maş há?icu wuḍ híşsunakud kc ?íd wuḍ ?ámjedkam maş wuḍ híşsun mo hab-á?ap si hékaj g ?ó?odham c hékaj g múmwál ha-kókda mo ?ab ge ?ál ha-jég c ?am ?éda há?icu ?e-tó?aw mo g múmwál s-?ú:waid kc ?an ge béikuḍag t ?an o béi g ?ó?odham k ?ab o si ?i wáñ?o k ?am ?ép o si ?i ñú?-ickwua t ?am o si wú:ş g héwel wé:nadk g s-?ú:wcu, k hég hab ?e-?á?aga híşsun. ?O g má:gina yá:nda há?icu o cú?akaḍ t si ?ál s-híşsunam ?ab o wú:şañid g héwel. Kc hab-a má:s ?am ?í:bhei tá:gíio hég hékaj mo g ñé:ñ ?an şóşbid g ?í:bhei k aş hab-a ?an hásko ?al ha-wú:şañ ñé:ñ dá:m (?o gn hú ?á?aijed) kc hékaj hab s-híşsunam

ʔab wú:sañ. Kutt hég hékaj hab ha-cé:c ʔídam káidag s-hípsunam ʔí:bhei.

Kutt ʔámjed ʔíd ʔam háhawa ʔep ʔáʔaga mo wuɖ ʔál hémako ʔí:bhei sɔ́:bida. M ʔia hab cúʔig /l/. Kut ʔídam ʔam a hékaj ʔi wúwha maʃ háʔicu wuɖ lálalag c ñé:ñ wíɖuta. Kutt ʔíd ʔam ʔi wú:ʃad ñé:ñ wíɖuta, mat ʔíd wuɖ o wé:hejedkamk ʔí:da káidag. Hé g hékaj mat hékid hab o ʔe-céi ʔí:da káidag /l/, kut g ñé:ñ kú:g ʔan ʔú:ɡk tá:tam wé:gaj o ʔe-géwʃ, k ʔan a hékaj hásko ʔép o si ʔe-wíɖu. Kutt hé g hékaj hab cé:c ʔí:da káidag ñé:ñ wíɖuta ʔí:bhei. Kc ʔép ʔí:da ñé:ñ wíɖuta, hab másmá ʔép ʔe-hékaj ʔam ha-tá:ɡio g ʔóʔodham, mat hébai héma g ʔe-ʔóksɡa ʔo g ʔe-kéliga o cem ñé:ñad t ʔéda gɖ hú aʃ ʔi héma o wé:maj ñéokad, c ʔam o ʔi háʔasa k ʔam o jí:wa ʔe-ʔóksɡa wúí ʔo ʔam ʔe-kéliga wúí, t hab o céi ʔí:da mo ʔam ha-ñé:ñahim “ʃá:cu ʔap hab ʔá:g c ʔam hía lálalag (ʔo ʔam hía wíɖut g ʔe-ñé:ñ).” Kc hab ʔép má:s mo ʔí:da lálalag hab-áʔap hía cem s-ʔápʔe mat o ʔe-hékaj ʔíd wé:hejed /l/ hé g hékaj mo hab wuɖ a ʔá:ga mo ʔí:da ñé:ñ wíɖuta, hé g hékaj mat hékid hab o ʔe-céi ʔí:da lálalag, t wáikko o ʔi ʔe-wíɖu g ñé:ñ.

Kutt ʔia ʔi kú:gí g háʔicu ʔá:ga ʔab ha-ʔámjed ʔídam ʔí:bhei sɔ́:bida mo hás másmá ʔab wú:sañ g ʔí:bhei cñí ʔámjed kc ʔép mo hás másmá gíʔikkpa ʔe-gáwulkajc. M ʔia hab cúʔig—(1) ʔí:bhei kúpadam, (2) dá:k ʔéd ʔí:bhei, (3) s-hípsunam ʔí:bhei, (4) ñé:ñ wíɖuta ʔí:bhei. Kc aʃ hab-a ʔam háʔicu aʃ kía wíʔis mo hab-áʔap wuɖ si háʔicu matt ʔam ʔép o ʔáʔaga ʔab ha-ʔámjed ʔídam ʔí:bhei sɔ́:bida mo hás másmá ʔi hóhoikʔe g ná:nko cúʔidag ʔam cñí ʔed. Kutt hé g hékaj ʔíd ʔam ʔi ʔép wú:ʃad maʃ háʔicu wuɖ géwʃp matt ʔíd o hékaj ʔam ha-wé:hejed ʔídam cñí c ñé:ñ mo hás másmá ʔi hóhoikʔe. Hab másmá mattp ʔíd ʔam o ʔáʔaga /t/, kutt hémho hab o a céi mat g ñé:ñ—kú:g—dá:m ga hú o ʔe-géwʃ ʔú:ɡk tá:tam ʔab; ʔo ʔíd ʔam o ʔáʔaga /s/, kutt hémho hab o a céi mat g ñé:ñ—kú:g ga hú o ʔe-géwʃ ʔú:ɡk—tá:tam

—wé:gaj; ʔo ʔattp hémʃ ʔíd ʔam o ʃa ʔáʔaga /m/, kutt hémho hab o a céi mat g cñí ʔab ʔe-ʔáb o ʔe-gégewʃ. Kc ʔé:p ʔí:da maʃ wuɖ géwʃ hab-áʔap si ʔe-hékaj táʃ ʔóidam, kc hab wuɖ ʔá:ga mat hébai háʔicu ʔab o ʔe-tá:t háʔicu ʔab ʔo hébai héma ʔab aʃ o ʃa wóʔokad héma ʔáb, k hé g hab ʔe-ʔáʔaga géwʃ. Kut hékid ʔim hú hab o ʔi ʔe-jú: ʔab ʔámjed mat ʔab o ʔe-géwʃcid kut hab háhawa ʔép o ʔe-céi géwʃpiʔo. Kutt hé g hékaj ʔíd hékaj ʔam ha-wé:hejed ʔídam ñé:ñ c cñí hé g hékaj mo wuɖ ʔídam c ʔan hásko ʔe-gégewʃʃap c ʔép ʔe-gégewʃʃa-piʔok.

Kut ʔámjed ʔídam ʔam ʔi ʔép wúwha hétasp káidag. M ʔia hab céʔig—/i, e, u, a, o/. Kc aʃ hab-a hab hí má:s mat hékid hab héma o ʔe-céi ʔídam káidag kut pi ʔan hú háʔicu o kú: ʔo sɔ́:bí g ʔí:bhei kc ʔam aʃ o wú:sañid. Kutt ʔam hab ʔi t-ʔá: matt ʔíd hékí hú hékaj kúkpá ʔam háʔi ha-wé:hejed g káidag kc aʃ hab-a hab hí má:s mo ʔan háʔicu kúkpá g ʔí:bhei. Kutt hékaj hab ʔi t-ʔá: matt ʔíd o hékaj kú:piʔok mo aʃ ʔáigo hab wuɖ ʔi ʔá:ga ʔab ʔámjed ʔí:da kúkpá. Kuc heg hékaj hab ha-ʔáʔaga ʔídam hétasp káidag cñí—kú:piʔoka—ʔí:bhei.

Kutt ʔámjed ʔam háhawa ʔép ʔi ha-gáwulkai ʔídam hétasp káidag hé g hékaj mo g cñí ʔam a ʃa gáwul másmá ʔi ʔe-kúkpiʔok mat hékid hab héma o ʔe-céi ʔídam káidag. Kuc ʔam ʔép ʔáʔagahim t ʔíd ʔam ʔi wú:ʃ ʔi háʔadka heg hékaj mat hékid hab héma o ha-céi ʔídam cñí kú:piʔoka ʔí:bhei k hémho o a ʔi ʔe-háʔadkai, k ʔéda cem héɖai s-má:c g ʔóʔodham mo háscu wuɖ ʔi háʔadka, kutt hékaj hab ʔi ʔép t-ʔá; matt ʔíd ʔép o hékaj ʔam ha-wé:hejed ʔídam cñí kú:piʔoka ʔí:bhei mat wáikk wuɖ o cém—ʔi—háʔadkak (/i, e, u/) c gó:k wuɖ o géʔé—ʔi—háʔadkak (/a, o/). Kutt hab másmá ʔam ʔi ha-gáwulkai.

Kut ʔíd ʔam ʔi ʔép wú:ʃ mo-kí ʔí:da cñí hébai ʃa s-ʔólasim ʔi ʔe-kúkpiʔok kc hébai ʃa s-hábalim. Kutt ʔam hab ʔi ʔep t-ʔá: matt-kí ʔép o ʔi ha-gáwulkai ʔídam hétasp

káidag hég hékaj mo-kí pi wuḍ a'í hégai mo há'í cém wuḍ 'í há'adka kc há'í gé'ě wuḍ 'í há'adka, hég hékaj mo-kí gó:k 'ídam 'í há'adka s-ʔólasim 'í 'e-kúkpi'ok g cín kc wáik 'ép s-hábalim 'í 'e-kúkpi'ok. Kutt hég hékaj hab ha-cé:c 'ídam gó:k s-ʔólasim—'í—kú:pi'oka. M 'ia hab cú'ig—/u, o/. Kutt 'ídam há'í hab 'ép ha-cé:c s-hábalim—'í—kú:pi'oka. M 'ia hab 'ép cú'ig—/i, e, a/. Kc 'é:p mo 'í:da s-ʔólasim hab-á'ap si hékaj g ʔó'odham hég hékaj mat hébai héma o 'e-hí: k hab o céi "s-ʔólasim 'apt o ñí-hí:" ʔo hébai héma 'ab o héma s-ʔóñhinam k o 'í 'ólat g 'e-nówí. Kc 'í:da héma maṣ wuḍ s-hábalim hab wuḍ 'ép-hí 'á:ga mat hébai g bó:l 'am o dáhákad t g má:gina 'am dá:m o mé: t o 'e-hábalka, ʔo hébai g yá:nda g hó'í o cú'akad ʔo g lá:wos t o 'e-hábalka. K hég hab 'e-ʔá'aga s-hábalim.

Kutt ámjed 'íd 'am háhawa 'ép 'á'aga mo há:s má:ma 'í hóik'e g ñé:ñ, kut 'íd 'am 'í wú:s maṣ há'ícu wuḍ 'í híhimicuda mo hab-á'ap si hékaj g ʔó'odham mat hébai héma 'an o dáhiwua káwyut 'an, k hég o híme ʔo tácuḍe tá'í o 'í híme g káwyu, ʔo héma 'an o há'ícu béi hab má:ma mo g mí:sa ʔo g dáikuḍ ʔo g wó'íkuḍ k 'an hásko o 'í híme, t héma o ñéidat c hab o céi "hé g ʔo g mí:sa 'an há:s 'í híhimicud," kut hég hékaj 'ab 'ép si 'áb 'e-úl 'í:da ñé:ñ mo bá'ic 'í híhim ke 'ép tá'í 'í híhim, ke aṣ hab-a 'ídam hab wúa mat o 'í hí: 'ídam hétasp káidag. Kutt hég hékaj 'am 'ép 'í ha-gáwulkai 'ídam káidag, kuc gí'ikk hab ha-ʔá'aga ñé:ñ—'í—wáñckwupdam. M 'ia hab cú'ig—/e, u, a, o/. Kuc hémako hab 'á'aga ñé:ñ—'í—ñú'ickwupdam. M 'ia hab cú'ig—/i/. Hé g hékaj mat hébai há'ícu o 'í 'e-wáñckwua k tá'í o 'í hí:, k hébai há'ícu o 'í 'e-ñú'ickwua k bá'ic o 'í hí:. Kut 'éda hékid hab héma o céi 'í:da káidag t o 'í ñú'ickwua g ñé:ñ ʔo 'ídam há'í káidag t o 'í wáñckwua g ñé:ñ. Kut hég hékaj 'ab 'ép si 'áb 'e-úl 'í:da ñé:ñ—'í—híhimicuda kc wuḍ 'ídam káidag kc 'í híhimicud g ñé:ñ tá'í kc bá'ic.

Kutt 'ia 'í kú:gí g há'ícu t-tá:so gida 'ab

ha-ʔámjed 'ídam cécgig mat 'am 'í ha-gá'agwulkai 'ídam ha-ʔé'eḍa ná:nko má:s káidag. Kc aṣ hab-a hab hía 'ép má:s mo gí'ikk 'am aṣ kía wí'is. M 'ia hab cú'ig /w, y, h, ʔ/. Kuc aṣ hab-a hía cem 'éḍgid g cécgig 'am ha-wé:hejed 'ídam káidag, kutt aṣ hab-a pi 'an hú ha-ʔó'oha ha-wé:nadk 'ídam há'í m 'in ʔó'ohaḍag, heg hékaj mac aṣ táccu matt 'ídam 'am o a'í kía ha-tá:so gí mo hab má:s mo gé'eged wuḍ 'í gá'agwulkada.

4. When we began work on the sounds of the Papago language, we discussed the question of an appropriate way in which to refer to the subject matter as a whole. The terms which suggested themselves immediately were *káidag sound* and *cé'idag expression*, terms which we use daily. And it seemed obvious that if we wanted the Papago speaker to derive something from this linguistic study, we were obliged to use a terminology which was current and suggestive for them. We chose the term *káidag sound* to be used in reference both to articulate expression and acoustic impression. The word *káidag* is derived from the verb *ká: to hear*, and refers to sounds which are audible to humans. For example, consider an event at which people are gathered. Some of them are speaking, some are singing, and some are shouting. A person hearing this might remark: 'am ʔo hía KAIDAG g hémajkam' *there is the sound of people*. By contrast, the term *cé'idag expression* is derived from the verb *cé'ě to say*. It is not appropriate as a general term for phonology because of the fact that it refers not to audible sound but rather to the act of uttering speech. Furthermore, it refers [idiomatically] to situations like the following: a person works or plays ball with a certain group that has a particular favorite expression; this person might explain to his family 'hé g ʔo wuḍ si ha-cé'IDAG hégam mañ 'am ha-wé:m cícwí' *that expression belongs to those people that I play (ball) with*.

Another term which enters frequently into our discussion of the sound system is

ʔi:bhei *breath, lung air*. It is a term which all of us use, not only Papago speakers, but everyone. We use the term in connection with phonology since it is involved in the production of all linguistic sounds—when one breathes, lung air passes through the mouth. The expression ʔi:bhei is used in many of our phonological terms. For example —ʔi:bhei só:bida *breath interception* (=consonants); cñ kú:piʔoka ʔi:bhei *mouth open breath* (=vowels); s-hípşunam ʔi:bhei *hissing breath* (=fricatives); and so forth.

We will now discuss the terminology we have selected for the different sounds within the two classes, consonants and vowels. We will discuss the consonants first and, having finished that, we will discuss the vowels. Recall my mention of the fact that if we wish Papago speakers to derive information from this linguistic study, we are obliged to use a terminology which is meaningful for them. We have, therefore, rejected the idea that the English terminology should be translated literally into Papago, since in some cases this distorts the intended meaning; although some cases might be appropriate. Consider the term *consonant*. One might ask why this traditional term could not be used. However, if it were translated literally (that is, according to its etymology) it would be meaningless to the speaker of Papago, since it would be rendered as wé:m káidag *without sound* and would suggest to the Papago speaker that all sounds are identical. This is obviously not so, since there are many different sounds in Papago. The term that did emerge for use in reference to these sounds was ʔi:bhei só:bida *breath interception*. The word só:bida *interception* is derived from só:bid *to intercept, to block* which refers to situations in which one thing gets in the way of another. It is used daily among cattlemen, horsemen, or deer hunters. Whenever a person attempts to só:bid *intercept* or *block* animals, it is inevitable that one will get through at some point, since the term só:bid does not mean that

the animals are completely shut off or stopped. Therefore, the expression só:bida seems entirely appropriate for certain Papago sounds. The lips and tongue assume one or another position and then move to another position, thereby intercepting the breath. That is our reason for using the term só:bida.

We then divided the consonants into four classes.

Nine of the consonants are such that they shut off the breath. These are /p, t, c, k; b, d, ɖ, j, g/. We therefore decided to use the term kúkpadam *closer, shutter, stopper* for these nine. The word kúkpadam is from kú:p *to close, shut*, another every-day word used in reference to the closing of a door or gate, or to the turning on or off of a water faucet. Many Papago speakers are irrigators and perform the act of cutting off water. We selected the term kúkpadam for these nine sounds, since the lips and the tongue stop the air flow during their production—so we have given the name ʔi:bhei kúkpadam *breath stoppers* to these sounds.

There is an additional acoustic property associated with the stop consonants. In considering this, it became clear that some of them were preceded by an [h]. We paired the sounds which are most similar, that is, /p, b/ /t, d/ /c, j/ /k, g/. It is clear that when these sounds are in non-initial position, one member of each pair is pre-aspirated while the other is not. Those which are pre-aspirated are /p, t, c, k/, and those which are not are /b, d, ɖ, j, g/. This is evident from the pairs /ʔáp, ʔáb/, /ʔí:ta, ʔí:da/, /kí:c, kí:j/, /wó:k, wó:g/. On the other hand, when these sounds are in initial position, there is no pre-aspiration in either case. They remain distinct, nonetheless. Therefore, it is not necessarily pre-aspiration, which keeps them apart. We consider, then, what it is that distinguishes them in such pairs as /pí:s, bí:s/, /tái, dáí/, /cí:wa, jí:wa/, /kái, gái/. It became clear that there is a certain burst of noise when these sounds are pronounced. So we took one of the pairs,

namely /k, g/, and pronounced them softly to ourselves. It became evident that one of them had a loud burst, while the other did not. This is not a loud burst or explosion in the sense of one which is audible to others, but rather, when spoken softly it is clear that one of the sounds has a narrow (or piercing) burst while the other is not narrow in the same sense. The expressions which suggested themselves immediately were s-mú?ukam *sharp* and s-hé:bagim *mellow*. These terms seemed appropriate for these stops, because s-mú?ukam suggests to the Papago speaker not only the sharpness of a pin or knife but also that of a piercing scream. When one hears such a scream, he might remark 'hég ?at si s-mú?UKAM híhin' *he screamed sharply*. And in a half-joking manner, one might say 'cem ?álo ?at ñ-cú?akađ g m-híhinkí' *your scream almost pierced me*. So we chose this term for those sounds which are characterized by the narrow burst of sound. The expression s-hé:bagim *mellow*, on the other hand, refers to situations like the following: a person speaks angrily at one time and later calms down and comes to you speaking in his normal voice—you might say '?i ?at jí:wa k háhawa si s-HÉ:bagim ñéok' *he came and he is now speaking calmly*. Another situation might be the following: a person is riding his horse, he falls off but lands on soft ground—in reporting this event at home, he might say '?i ?ant géi ?ab káwyut ?ab k aš hab-a aš s-HÉ:bagim ?am géi heg hékaj mo s-móik g jéweđ' *I fell off my horse but I landed s-hé:bagim (that is, easily) because the ground was soft*. The term s-hé:bagim is an appropriate one for the stops which lack the sharp burst. Accordingly, we classify the nine stops as follows: four are s-mú?ukam *káidag sharp sounds*, to wit /p, t, c, k/; and five are s-hé:bagim *káidag mellow sounds*, to wit /b, d, ɟ, j, g/.

We next considered the four sounds /m, n, ñ, ŋ/. It is relatively apparent what these should be called, since while the breath is closed off at the lips or in the oral cavity, it

is allowed to pass through the nose. Papago speakers are familiar with this because when a person speaks with a nasal quality, one says 'hég ?o ge ?e-dá:k ?eđ ñéok' *he speaks through his nose*. Or when someone sees a cow snort, he might say 'hégai háiwañ ?at ?ab si ?i:bheiwua ?e-dá:k ?eđ' *that cow blew air through its nose*; a child is particularly prone to mention such a thing. It is therefore quite clear what these four sounds should be called—we have called them dá:k ?eđ ?i:bhei *breath through the nose (=nasals)*.

In considering an appropriate term for the two sounds /s, š/, the fly-spray came to mind immediately. The expression híp-šunakuđ *fly-spray* is derived from hípšun *to sound—of air forced through a small opening*. The device is familiar to Papago speakers who use it to kill flies; it has a small aperture and a substance is put in it which repels flies; its handle is moved backwards and forwards so that the repellent is forced out together with air. This action is referred to by the term hípšun. Also, if a tire is pierced, the air comes out s-hípšunam, that is, *in a hissing manner*. The same applies in the case of lung air which is intercepted by the tongue but is allowed to pass over the top (or even around the sides) in a hissing manner. For this reason, we have called these sounds s-hípšunam ?i:bhei *hissing breath (=fricatives)*.

When we considered the single consonant /l/ (a lateral flap), two expressions came to mind—namely lálalag *to chatter, gab, chew the fat* and ñé:ñ wíđuta *swinging of the tongue*. The latter was selected as an appropriate one for the sound under consideration because when it is pronounced, the tip of the tongue touches a point behind the upper teeth and swings away forcefully—we have therefore called the sound ñé:ñ wíđuta ?i:bhei *swinging of the tongue breath*. The word ñé:ñ wíđuta *swinging of the tongue* is used among speakers of Papago in reference to situations like the following: having waited for a spouse who has been conversing

at great length with another person, one might say upon the spouse's return 'śá:cu ?ap hab ?á:g c ?am hía LÁLALAG (?o ?am hía wíPUT G ?E-ÑÉ:Ñ)' *what were you gabbing (or swinging your tongue) about there?* The expression lálalag is also quite appropriate in reference to /l/—we have called the sound ñé:ñ wíđuta *swinging of the tongue* and the tongue swings three times in the word lálalag.

This concludes our discussion of the manners in which the breath emerges during the pronunciation of the consonants and of the four-way classification into

- (1) ?í:bhei kúkpadam *stops*,
- (2) dá:k ?eđ ?í:bhei *nasals*,
- (3) s-hípşunam ?í:bhei *fricatives*, and
- (4) ñé:ñ wíđuta ?í:bhei *flap*.

However, there remains another aspect of the consonants which requires discussion—namely, the movements of the different organs in the mouth. We selected the term géwşp *to press, touch, apply, lean, articulate* in order to refer to the movements of the lips and tongue. Thus, if we discuss /t/, we inevitably mention that the blade of the tongue *articulates* against the upper teeth; if we discuss /ş/, we mention that the tip of the tongue *articulates* at a point behind the upper teeth; and if we discuss /m/, we mention that the lips *articulate* against one another. The term is otherwise used in reference to one object touching another or to one person leaning against another. That is appropriately referred to as géwş. And when a body withdraws from the position in which it was applied, the word géwşpi?o *withdraw, disapply, disarticulate* is used. We therefore use these terms in reference to the tongue and lips, since these assume a position of articulation and then withdraw from it.

We then considered the class of sounds to which these five belong: /i, e, u, a, o/. By contrast with the others, these are always pronounced in such a way that the breath is not stopped or intercepted by any object. We recalled that we had used the

expression kúkpa *close* for some of the sounds in which it was evident that the breath was closed off. Therefore, we decided to use the antonym kú:pi?ok *to open*; and we labelled the above five sounds éñ kú:pi?oka ?í:bhei *mouth open breath (=vowels)*.

We then classified the vowels according to the different manners in which the mouth ?e-kúkpi?ok, that is, *opens* during their production. In our consideration of this, the expression ?i há?adka *to open the mouth* suggested itself, since when one pronounces a vowel, he inevitably opens his mouth. Speakers of Papago are familiar with this term, so we decided to use it and to stipulate that three of the vowels (to wit /i, e, u/) are cémm ?i há?adka *small mouth opening (=high vowels)* and that two (/a, o/) are gé?ě ?i há?adka *large mouth opening (=low vowels)*. And we classified the vowels accordingly.

It also emerged that in certain cases the lips open in a rounded manner and in others they open in a flat manner. We decided, therefore, to classify them in this way also, since the degree of mouth opening is not the only feature which characterizes the vowels. For two of the vowels the lips open in a rounded manner and for three of them the lips open in a flat manner—we labelled the first two s-?ólasim ?i kú:pi?oka *round opening* (/u, o/), and we labelled the remaining three s-hábalim ?i kú:pi?oka *flat opening* (/i, e, a/). The term s-?ólasim *in a round manner* is much used—for example, if a person gets a hair cut, he might say 's-?ÓLASIM ?apt o ñ-hí:' *cut my hair round* (that is, *give me a butcher*), or if a person prepares to hit another, he makes his hand *round* (that is, he doubles up his fist). The second term, s-hábalim *in a flat manner* is related to ?e-hábalka *to go flat*, said of a punctured tire or a ball flattened by a car.

We next considered the way in which the tongue moves, and the expression ?i híhimi-cuda *induced motion* suggested itself. The term is used in reference to such situations as when a rider wishes to make his horse

move forwards or backwards, or when a person moves furniture around. Seeing the latter, one might remark 'hég 'o g mí:sa 'an há:s 'I HÍHIMICUD' *he is causing the table to move from place to place*. The expression seemed appropriate in reference to the tongue movements, since the tongue moves forwards and backwards under the influence of the vowels. Accordingly, we classified the vowels as ñé:ñ 'i wáñickwupdam *tongue retractors* (=back vowels /e, u, a, o/) and ñé:ñ 'i ñú'ickwupdam *tongue advancers* (= the front vowel /i/), because when something is retracted, it moves backwards, and when something is advanced, it moves

forwards. When the vowel /i/ is pronounced, it advances the tongue; when the others are pronounced, they retract the tongue. Therefore, the term ñé:ñ 'i híhimicuda *induced movement of the tongue* seems entirely appropriate for these sounds which induce backward or forward motion of the tongue.

This concludes our explication of the terminology we have developed for the different classes of sounds. There are, of course, four other sounds—i.e., /w, y, h, '/. We have terms for these, but we do not include them here, since our present purpose is merely to explicate the terminology for the major classes.

SOME NOTES ON THE PROTO-SIOUAN CONTINUANTS*

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0. Introduction
1. Voiceless continuants
2. Voiced continuants
3. Sound symbolism and exceptions
4. Assumptions
5. Ohio Valley
6. Crow-Hidatsa
7. Etymologies

0. This paper is concerned with the evolution of the Proto-Siouan (PSi) consonants—more specifically, the nonnasal continuants. Hans Wolff¹ postulated the following PSi consonants: /p, t, k^v, k, q, s, x, h, w, L, L^v, m, n/. For the most part, we will be discussing the reflexes of k^v, s, x, w, L, and L^v, for which we use the letters, s, š, x, w, r, and ř, respectively. The use of these letters is in keeping with our belief that it makes good sense to postulate for PSi a voiceless strident obstruent and a voiced sonorant in each of the dental, palato-alveolar, and velar positions, and that PSi did not have a palatal or palato-alveolar stop. Wolff (1950:61) groups the Siouan languages into seven subfamilies: Crow-Hidatsa (CH), Mandan² (Ma), Dakota (Da), Chiwere-Winnebago (CW), Dhegiha (Dh), Ohio Valley Siouan (OV), and Catawba. We agree with him that Ma constitutes a separate subfamily; but we agree with Voegelin³ that Da, CW, and Dh constitute a single subfamily, Mississippi

Valley Siouan (MV). In this paper, we have omitted any consideration of Catawba. Hence, we are concerned here in accounting for the reflexes of PSi nonnasal continuants in Ma and in reconstructed OV, CH, and MV.

1. The reflexes of the PSi voiceless continuants in Ma, OV, CH, and MV are given in Table I.

(1, 2, 6, 7, 9, 16, 19, 20, 21, 24, 26, 28, 29, 33, 36, 48, 49, 50, 51, 52, 53, 54, 55.)⁴ The velar/palato-alveolar distinction in the reflexes of the PSi x in CH and MV appears to have developed through a change of x to š before high vowels; but there are quite a number of exceptions to this sound law, which suggests that it needs investigation. The voicing distinction in MV can be traced back to the position of the accent in pre-MV, i.e., continuants became voiced when followed by an unaccented vowel, and this change also affected the velar reflexes of PSi x in Da. Later changes in the accentuation of the MV languages (there has been a general tendency to move the stress to the penultimate syllable of the stem) brought about the phonemicization of these voiced continuants, and still other voicing rules were added to pre-Winnebago. Hence as a first approximation to a statement of these changes in CH and MV, we postulate two innovations consisting of the addition of rule H to the phonology of pre-CH and pre-MV, and of rule I to pre-MV.

$$\begin{array}{l} \text{Rule H} \quad \begin{bmatrix} -\text{int} \\ -\text{ant} \\ -\text{voi} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{cor} \\ -\text{bek} \end{bmatrix} / -\begin{bmatrix} -\text{cns} \\ +\text{hgh} \end{bmatrix} \\ \text{Rule I} \quad \begin{bmatrix} -\text{int} \\ +\text{cor} \end{bmatrix} \rightarrow [+ \text{voi}] / -\begin{bmatrix} -\text{cns} \\ -\text{acc} \end{bmatrix} \end{array}$$

* This work was supported in part by National Institute of Mental Health Grant MH 13390.

¹ Hans Wolff, *Comparative Siouan I, II and III*, IJAL 16.61-6, 113-21, and 168-78 (1950).

² I would like to thank Robert C. Hollow for giving me access to his recently collected Mandan material.

³ C. F. Voegelin, *Historical Results of Crow-Hidatsa Comparisons, According to Three Methods*, *Proceedings of the Indiana Academy of Science*, Vol. 50:39-42 (1941).

⁴ These numbers refer to the etymologies in 7.

Rule I was generalized in Da so that it applied to all continuants that preceded unaccented vowels. In fact, rule I still occurs as a synchronic rule in the phonology of Da: there are certain verb constructions that are signaled by the loss of an unaccented vowel, and if this vowel is preceded by an obstruent continuant, then when the vowel is lost the continuant is devoiced.

There are still two aspects of Table I which need to be accounted for. One is that the dental in Ma corresponds to palato-alveolars in the other subfamilies, and that the palato-alveolar in Ma corresponds to dentals. This implies that an innovation took place in the phonology of PSi which interchanged the point of articulation of the coronal strident. Hence we need an innovation consisting of

TABLE I

PSi	s	š	x
Ma	s	š	x
OV	č	s	x
CH	š	c	x/š
MV	š/ž	s/z	x/š/ž

the addition of rule F either to pre-Ma or to the other three subfamilies.

$$\text{Rule F} \begin{bmatrix} \alpha \text{ant} \\ +\text{cor} \\ \beta \text{hgh} \\ +\text{str} \end{bmatrix} \rightarrow \begin{bmatrix} -\alpha \text{ant} \\ -\beta \text{hgh} \end{bmatrix}$$

The other aspect of Table I which has to be accounted for is that CH and OV each contain a stop whereas the other two subfamilies do not. Hence there must be an innovation which consists of the addition of a rule that converts a stop into a continuant and/or one that converts a continuant into a stop. Thus, one or more of innovations G1, G2, G3, and G4 must be postulated to account for the correspondences given in Table I.

- Rule G1 $s \rightarrow c$
- Rule G2 $c \rightarrow s$
- Rule G3 $\check{s} \rightarrow \check{c}$
- Rule G4 $\check{c} \rightarrow \check{s}$

If we now take as our aim in the explanation of the correspondences set forth in Table I, the postulation of as few distinct innovations as are needed in order to derive these correspondences from postulated PSi consonants, then there are two possible solutions. These two solutions are alike in that they require us to reconstruct in PSi a dental and a palato-alveolar voiceless strident continuant, and to postulate rule F as one of the innovations. The two solutions differ in that one of them requires rule G1 and the other, rule G3 as innovations. We represent these two solutions in Tables II and III, respectively.

TABLE II

Ma	CH	MV	OV
	F G1 H	F H I	G1 F

TABLE III

Ma	CH	MV	OV
	G3 F H	F H I	F G3

We interpret Table II as follows: starting with the phonology of PSi, if we add rules F, G1, and H in that order to the phonology of pre-CH, we obtain the CH correspondences of the reconstructed PSi coronal voiceless continuants. Similarly, we add rules F, H, and I in that order to pre-MV in order to obtain the MV correspondences, and rules G1 and F in that order to pre-OV to obtain the OV correspondences. Note that none of these rules need be added to pre-Ma, i.e., as far as the coronal voiceless continuants are concerned, Ma preserves the PSi situation unchanged.

It should be noted that starting with the assumption that PSi itself did not exhibit

any dialectal differences with respect to the voiceless coronal continuants, any other solution to this problem must involve more than four distinct innovations. However, to assume dialectal differences within PSi would be simply to eliminate the problem, for it is just these dialectal differences which we are attempting to account for in terms of a single PSi consonant system and a set of innovations.

We have now offered two solutions for the correspondences given in Table I. We now consider certain other evidence in order to make a choice between these two solutions. Table IV gives the correspondences in recon-

TABLE IV

PSi	t	s	r	n	š	ř
CH	t	š	n/ř	n/ř	c	n/ř
OV	t	č	ř	n	s	ř

structed CH and OV of the PSi coronal consonants.

(1, 3, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 22, 28, 29, 30, 32, 33, 34, 35, 37, 40, 42, 43, 44, 45, 46, 54, 55, 56, 57, 59, 62.) PSi n, r, and ř fell together in CH and appear as a single systematic phoneme as n in word-initial position, and as ř—a dental flap—intervocally. Hence we need innovations added to pre-CH which state that coronal sonorants become n initially and an interrupted dental sonorant intervocally. For OV we also need an innovation which says that the dental sonorant becomes interrupted. So we see that in CH all nonnasal dentals are interrupted and the only palato-alveolar consonant is a continuant; whereas in OV the only dental consonant which is not interrupted is the s, which by innovation F comes from a palato-alveolar, and the only palato-alveolar stop comes from a dental. We can account for the correspondences of Table I, as well as most of those of Table IV, if we take Table II as the correct representation of the evolution of the PSi obstruent con-

tinuants, and generalize rule G1 to G, i.e., to include all the nonnasal dentals.

$$\text{Rule G} \quad \begin{bmatrix} +\text{ant} \\ +\text{cor} \\ -\text{ns} \end{bmatrix} \rightarrow [+ \text{int}]$$

Table II states that at some point in the history of pre-CH and pre-MV there was an interchange of s and š (rule F), i.e., wherever an s appeared in the lexicon before the change, an š appears after the change, and wherever there was an š before the change, there is an s after it. Admittedly, this is an unusual type of sound change; but it is not impossible. Bloomfield⁵ points out that when an Alsatian German uses the stop phones of Alsatian German, which are voiceless and unaspirated, in speaking English, these are interpreted by English speakers in positions where a voiceless stop would be aspirated as having the opposite voicing from what they should have. Thus, the Alsatian German's 'buy' [pay] is heard as [p^hay] and his 'pie' [pay] is heard as [bay]. This fact is also true for Pennsylvania Dutch and has become the basis for a secret language among many children in Philadelphia, in which they regularly interchange the corresponding voiced and voiceless stops in those positions where a voiceless stop would be aspirated. While attending school in Philadelphia, the present author learned how to speak this language without exerting any conscious effort.

2. We now consider the correspondences in the four major subfamilies of the PSi nonnasal sonorants. These are given in Table V.

(12, 14, 16, 17, 24, 38, 39, 40, 55, 56, 57, 59, 60, 62.) In addition to the changes in pre-CH and pre-OV stated in connection with Table IV, PSi r became n initially in Ma, and PSi w became m initially in CH. The nasal reflex of PSi w in Ma is at this point

⁵ Leonard Bloomfield, *Language*, Holt, New York (1933).

somewhat obscure: it appears fairly often in initial position, but not at all elsewhere. In order to account for these correspondences, we postulate innovations consisting of the addition of rules C, D, and E to pre-Ma and pre-CH.

Rule C

$$\begin{bmatrix} -\text{obs} \\ -\text{ant} \\ +\text{cor} \end{bmatrix} \rightarrow [+ \text{nsl}]$$

Rule D

$$\begin{bmatrix} -\text{obs} \\ +\text{cor} \end{bmatrix} \rightarrow [+ \text{ant}]$$

Rule E

$$\begin{bmatrix} +\text{cns} \\ -\text{obs} \end{bmatrix} \rightarrow [+ \text{nsl}] / \# -$$

These innovations along with the others we have discussed are added to the four subfamilies in accordance with Table VI.

TABLE V

PSi	r	ɾ	w
Ma	n/r	n	m/w
OV	ɾ	ɾ	w
CH	n/ɾ	n/ɾ	m/w
MV	r	ɾ	w

Returning now to Table V and the examples given, we note that these correspondences do not occur before all PSi vowels. In particular, PSi r and w do not occur before the accented high nonnasal vowels, í and ú, and ɾ does not occur before í, although it does occur before ú. This leads us to look for other sets of correspondences which do occur before these vowels, i.e., which are in complementary distribution with the PSi nonnasal sonorants. There are such correspondences—given in Table VII—although the number of stems exhibiting these is rather small.

(15, 41, 58, 61.) Note that Table VII differs from Table I in that voiced obstruent continuants appear before accented vowels in reconstructed MV; whereas in Table I they occur only before unaccented vowels. It is also the case that the first column of correspondences in Table VII occurs only before í and ú, and the other two columns occur only before í.

Since the respective columns of Tables V and VII are in complementary distribution, we can assign each pair to a single reconstructed PSi phoneme; but we also have to postulate a phonological rule which accounts for these correspondences, i.e., rule A.

Rule A

$$\begin{bmatrix} +\text{cns} \\ -\text{int} \\ \langle +\text{hgh} \rangle_a \end{bmatrix} \rightarrow [+ \text{obs}] / -$$

$$\begin{bmatrix} -\text{cns} \\ +\text{hgh} \\ -\text{nsL} \\ +\text{acc} \\ \langle -\text{bck} \rangle_b \end{bmatrix}$$

$$a \supset b$$

TABLE VI

Ma	CH	MV	OV
C			
D	D		
E	E		
	F	F	G
	G		F
	H	H	
		I	

TABLE VII

Ma	s	š	x
OV	č	s	x
CH	š	c	x
MV	ž	z	ǵ

We now note that in all but MV, the reflexes of the sonorants before high vowels are voiceless, i.e., in just those subfamilies in which there is no voicing distinction among the obstruents. Hence we need a rule which devoices obstruents, in particular, those which arise through the application of rule A.

Rule B

$$[+ \text{obs}] \rightarrow [- \text{voi}]$$

Table VIII represents the innovations that we have discussed so far. Since rule A applies to all the Siouan languages, and can apply before all the other innovations—in fact, it must apply before F and G—it can be regarded as simply a rule in the synchronic phonology of PSi.

There are a few exceptions (*rúše, *rúte) to innovation A in verb stems which begin with the syllable *rú* in PSi, and whose meaning suggests that the hands are used in carrying out the activity referred to by the stem. This suggests that these stem initial syllables had been reinterpreted as the instrumental affix *ru-*, which is prefixed to verb stems. This may, of course, be the actual origin of these stems; but if so, then we have no explanation for their accentuation, for the instrumental prefixes are otherwise unaccented in PSi.

3. We must now consider a number of exceptions to rule F, i.e., stems which in CH,

TABLE VIII

Ma	CH	MV	OV
A	A	A	A
B	B		B
C			
D	D		
E	E		
	F	F	G
	G		F
	H	H	
		I	

MV, and OV do not appear to have been subject to this innovation. Before doing so, however, it is necessary to discuss an interesting phenomenon exhibited by the Siouan languages, viz., the sound symbolism exhibited by a rather large number of verb stems. Consider the following Da stems: *bláza torn in a straight line*, *bláža forced apart producing strain*, *blága spread apart in all directions*; *mnúza makes a crunching sound*, *mnúža makes a crackling sound*, *mnúğa makes a noise like breaking*; *sóta clear*, *šóta muddy*, *xóta gray*; *súza slightly bruised*, *šúža badly bruised*, *xúğa fractured*; *ptúza bent*, *ptúža pieces cracked but not broken off*, *ptúğa pieces broken off*; *zí yellow*, *ží tawny*, *ǵí brown*. (See Boas and Deloria for numerous other examples).⁶

⁶ Franz Boas and Ella Deloria, *Dakota Grammar*, National Academy of Sciences Memoirs Volume 23, part 2 (1941).

What we see here exhibited is a rather direct correspondence between sound and meaning, i.e., the occurrence in a stem of a dental, palato-alveolar, or velar obstruent continuant corresponds to an aspect of the meaning of the stem which might be characterized as diminutive, normal, and augmentative, respectively. This sound symbolism is what might be called semi-productive in Da, i.e., many speakers are aware of it and will create new stems on analogy with existing stems and the sound symbolism. However, these newly created stems are used for the most part in jokes and puns, and do not normally become a part of the language. In Crow, Hidatsa, and—as far as I can tell—Ma and the OV languages, the sound symbolism is in no way productive, although there are a number of pairs and a few triples of stems in these languages which clearly exhibit it. As for the extant MV languages, there are many such pairs and triplets of stems, and it is possible that the sound symbolism has a certain degree of productiveness as it does in Da. Now for some of the exceptions mentioned above (the full etymologies and meanings are given in 7).

<i>scratch</i>		<i>scrape</i>	
Ma	kés	Hi	-káaxi
Da	kʔéza	Ma	kéx
		Da	kʔéğa
<i>yellow</i>		<i>tawny</i>	<i>brown</i>
Hi	cfiri	Hi	šfiri
Ma	sí	Ma	ší
Da	zí	Da	ží
Bi	sí		
		<i>peel</i>	<i>strip</i>
		Ma	šáp
		Os	-žábe
		Da	-ǵápa
<i>whitish</i>		<i>gray</i>	<i>dark gray</i>
		Ma	šót
Da	sóta	Da	šóta
		Da	xóta
<i>tinkle</i>		<i>rattle</i>	
Ma	sró	Ma	xró
Da	sná	Da	xná

We note that all of these exceptions to innovation F involve stems which enter into

the sound symbolism as described above for Da. One possible explanation for these exceptions is that the sound symbolism was productive in PSi, i.e., there was a grammatical rule which accounted for this relationship between the phonological and semantic aspects of these stems. This rule is one of semantic interpretation which states that if a stem is one that is involved in sound symbolism, then it is to be interpreted semantically as diminutive or not and augmentative or not depending upon the point of articulation of its obstruent continuants. Note that PSi also has a diminutive and an augmentative particle, although only the augmentative particle *xti has a clear reconstruction, and those stems that are not involved in sound symbolism have this aspect of their semantic interpretation governed by which, if either, of these suffixes is present. Hence the sound-symbolism stems have a part of their semantic interpretation determined by semantic rule J.

$$\text{Rule J} \quad \begin{bmatrix} \alpha \text{ant} \\ \beta \text{bck} \\ -\text{int} \\ +\text{str} \\ +\text{SS} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha \text{DIM} \\ \beta \text{AUG} \end{bmatrix}$$

This rule of semantic interpretation states that if a stem which contains the feature [+SS], i.e., participates in sound symbolism, contains an s then the set of semantic features of the stem includes [+DIM] and [-AUG], i.e., it is a diminutive stem; if the stem contains an š then these features are [-DIM] and [-AUG]; and if it contains an x these features are [-DIM] and [+AUG], i.e., it is an augmentative stem. Furthermore, as long as rule J operates as a part of the semantic interpretation of the language, any sound change affecting these obstruents that the language undergoes, such as rule F, will not affect the semantic interpretation of the three points of articulation of these obstruents.

It is also important to note from the forms for yellow, tawny, and brown that the sound

symbolism is not confined in PSi to stems containing voiceless continuants. The obstruents that come from PSi sonorant continuants before certain accented vowels (rule A) and appear as voiced obstruents in the MV languages also participate in the sound symbolism. However, I have not observed in any of the Siouan languages any evidence of sound symbolism involving the sonorant continuants which did not become obstruents. One possible explanation for this is that the sound symbolism did not develop as a grammatical characteristic of PSi until after rule A had become an integral part of its phonology, and that when it did it came to involve stems with both voiced and voiceless obstruent continuants.

One can find a few additional bits of evidence that support this solution. The Da word for the Missouri River is mníśóta, which most Da speakers say means *muddy water*. However, this compound consists of mní *water* and śóta, which as a verb stem means *clear* or *hazy*. We can explain this by saying that this compound was originally *mníśóta, containing the stem śóta *muddy*, and that as a lexical item it was affected by innovation F; but the semantic equation *Missouri River* = *muddy water* remained as a part of the speakers' folk knowledge. A similar situation obtains with the Omaha (Om) stems sóde *to be smoky*, šóde *to be muddy*, śóde *smoke*. In this case, the noun stem šóde is semantically related to the verb sóde, whereas it is phonologically related to the verb śóde. The explanation for this is that the noun šóde originally had a dental obstruent as its initial and was affected by innovation F; but the association between sound and meaning in the case of the verb stems continued to be determined to some extent by semantic rule J.

4. The assumptions about PSi we have made so far are that its consonants consisted of three stops /p, t, k/, three (voiceless) obstruent continuants /s, š, x/, three (voiced) sonorant continuants /r, ɹ, w/, two

nasals /m, n/, and two glides /ʔ, h/; that it contained a phonological rule that changed the voiced continuants into obstruents before certain accented vowels (rule A); that it classified verb stems according to whether or not they participated in the sound symbolism; and that it had a semantic interpretation rule which assigned values to the semantic features [diminutive] and [augmentative] in stems which participated in the sound symbolism and that this assignment was based on the point of articulation of the obstruent continuants (rule J) in the stems. We have also assumed that in the evolution of the Siouan languages more and more stems were moved out of the sound-symbolism category. This process of changing the category of a stem might in some cases have been engendered by a semantic change of the stem so that its meaning was no longer felt to be related to that of another stem by means of the features [diminutive] and [augmentative]. In CH, MV, and OV those PSi stems that did not belong to the sound-symbolism category underwent innovation F, as well as those stems which had shifted out of this category before the operation of innovation F. Hence only sound-symbolism stems which moved out of this category after innovation F had played its role in the evolution of these subfamilies do not exhibit the effect of this innovation.

The other assumptions we have made concern the way in which the early Siouan dialects evolved with respect to one another, and these are embodied in the way in which we interpret Table VIII. We have said that we consider the number of distinct innovations as being a measure of the simplicity of this reconstruction of PSi. Hence we consider innovation F, for example, to have been a single 'historical event' in the evolution of the Siouan languages, in spite of the fact that its effects were felt in three of the major subfamilies. This implies that when rule F was added to the phonologies of these three Siouan dialects, either it was

added to all three at about the same time or it was added to one of them and it then spread across dialect boundaries to the other two. Note, however, that the order in which rules F and G must be added to the phonology of CH differs from that in which they must be added to OV. This suggests either that these two innovations originated in different dialects at the same time, relatively speaking, and then each spread to the other dialect; or that they originally appeared in the same order in both pre-OV and pre-CH, and then in one of them their order was changed during the time in which they both still functioned as synchronic rules in the phonology. Kiparsky⁷ argues quite convincingly that reordering of phonological rules is one of the ways in which languages change. However, the general principle governing such reordering—RULES TEND TO SHIFT INTO THE ORDER WHICH ALLOWS THEIR FULLEST UTILIZATION IN THE GRAMMAR—is not applicable in this case: One of the two possible orders of rules F and G is both a bleeding and a feeding order, whereas the other order is neither. It is also questionable that either of these rules would be retained for very long in the grammar as synchronic rules, for neither of them plays a role in those few morphophonemic alternations to which the early Siouan dialects were subject. Hence it is somewhat unlikely that there ever was a time in the evolution of pre-OV or pre-CH during which both F and G functioned as synchronic rules. This leaves us with the explanation for the different orders in which rules F and G must be added to pre-OV and pre-CH which is suggested by the wave theory of language descent.

5. Let's now follow the evolution of the PSi coronal continuants as they evolved from PSi to the OV languages, Biloxi (Bi),

⁷ Paul Kiparsky, *Linguistic Universals and Linguistic Change*, in Emmon Bach and Robert T. Harms (eds.) *Universals in Linguistic Theory* pp. 170-202 (1968).

Ofo (Of), and Tutelo (Tu). We start with PSi containing the semantic rule J and the phonological rule A. When phonological rule B is added, the grammar is changed by the respelling of stems by replacing the obstruent allophones of the voiced continuants by the corresponding voiceless continuants. With this change, rules A and B are no longer a part of the grammar, i.e., they have no effect and hence are lost. When rule G is added there are respellings in the lexicon, replacing s by c and r by ř, as well as probably some changes in the phonological rules in order to accommodate this new phonetic fact of the language that all dental consonants are stops. Then rule F is added to pre-OV, and the lexicon is again respelled in that c is replaced by č and š is replaced by s. However,

innovations:

Rule K	$\begin{bmatrix} -\text{ant} \\ +\text{cor} \end{bmatrix}$	$\rightarrow [+int]$
Rule L	$\begin{bmatrix} +\text{cns} \\ -\text{obs} \\ +\text{hgh} \end{bmatrix}$	$\rightarrow [-cor]$
Rule M	$\begin{bmatrix} -\text{obs} \\ +\text{cor} \\ -\text{nsI} \end{bmatrix}$	$\rightarrow [+lat]$
Rule N	$[+int]$	$\rightarrow [+obs]$
Rule O	$[+int]$	$\rightarrow [-voi]$
Rule P	$\begin{bmatrix} +\text{obs} \\ -\text{int} \\ \alpha\text{cor} \end{bmatrix}$	$\rightarrow \begin{bmatrix} +\text{ant} \\ -\alpha\text{cor} \\ -\text{hgh} \\ -\text{bck} \end{bmatrix}$

These innovations are added to the OV pre-languages in accordance with Table X.

TABLE IX

OV	t	s	ř	č	ř	x
Bi	t	s	d	č	y	x
Tu	t	s	l	č	y	x
Of	t	f	t	č	č	s

rule J is still operative affecting those stems that participate in the sound symbolism. Hence before the addition of rule F such a stem with a c was diminutive; but with the addition of this rule the c is replaced by č and rule J changes the meaning of the stem to normal. Similarly, rule F changes š to s, and if this š was in a sound-symbolism stem then rule J effects a change of the meaning of the stem from normal to diminutive.

Now the sound symbolism becomes non-productive in pre-OV, i.e., rule J is no longer a part of the grammar, and whether or not a stem is diminutive or augmentative is specified by its semantic features in its lexical entry. This is the situation in Proto-OV.

The correspondences in Bi, Tu, and Of of the OV dental and palato-alveolar nonnasal consonants and the velar continuant are given in Table IX. In order to account for these correspondences, we need the following

TABLE X

Bi	Of	Tu
L		L
N	K N O P	M

6. We now follow the evolution of the PSi coronal continuants as they evolved from PSi to the CH languages, Crow (Cr) and Hidatsa (Hi). With the addition of rule B to pre-CH, the grammar is changed for the most part by the respelling of lexical items, i.e., where the sonorants occur in environments where they take on their obstruent allophones, these sonorants are replaced by the corresponding voiceless obstruents. With this change, rules A and B are no longer a part of the grammar. With the addition of phonetic rules D and E, all occurrences of n and ř are replaced by r in the lexicon, and rule E is retained as a part of the phonology of pre-CH. When innovation F occurs, the effect is that of further respellings in the lexicon, i.e., s is replaced by š and š is replaced by s. However, rule J still operates to

associate sound-symbolism stems that contain an *s* with a diminutive meaning, and such stems that contain an *š* with a normal meaning. The language then undergoes innovation G, i.e., *s* is replaced by *c* and *r* by *ř* in the lexicon. This brings us to the parent language of Cr and Hi, by which time the sound symbolism is no longer productive.

The correspondences in Cr and Hi of the CH dental and palato-alveolar consonants are given in Table XI. We note that Hi has not changed from the CH situation, where in Cr, the coronal obstruents have split. The dental obstruents occur before the vowel *a*, and the palato-alveolars occur in other posi-

TABLE XI

CH	t	c	ř	n	š
Hi	t	c	ř	n	š
Cr	s/š	t/č	ř	n	s/š

tions. Hence, to explain these developments in Cr, we need the following innovations.

$$\text{Rule Q} \quad \begin{bmatrix} +\text{obs} \\ +\text{ant} \\ +\text{cor} \\ \alpha\text{str} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{ant} \\ \alpha\text{int} \\ +\text{str} \end{bmatrix}$$

$$\text{Rule R} \quad \begin{bmatrix} +\text{obs} \\ \alpha\text{int} \\ +\text{cor} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ant} \\ -\alpha\text{str} \end{bmatrix} / - \begin{bmatrix} -\text{cns} \\ +\text{low} \end{bmatrix}$$

And these are added to pre-Cr in this order.

The Cr phones given in Table XI are taken from Kaschube (1960).⁸ In all of Lowie's Crow material, however, in place of the *č* we find *c*. We can account for this by saying that innovation Q' at first applied only to the *t*, i.e.,

$$\text{Rule Q'} \quad \begin{bmatrix} +\text{obs} \\ +\text{ant} \\ +\text{cor} \\ -\text{str} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{ant} \\ -\text{int} \\ +\text{str} \end{bmatrix}$$

and that this was later generalized to rule Q.

⁸ Dorothea V. Kaschube, *Structural Elements of Crow*, Ph.D. Thesis, Indiana University (1960).

This, of course, requires that rule Q' remained operative in the phonology of Cr at least until after this generalization occurred. A more straight-forward explanation would be to say that first Cr underwent innovations Q' and R, then within the last forty years the *c* was replaced by *č* as a separate innovation.

The development of the coronal continuants in the MV subfamilies Da, CW, and Dh is in one sense quite straight-forward, i.e., the obstruents pretty much remained unchanged. On the other hand, the development of the sonorants appears to be somewhat chaotic. This is not to say that the correspondences are unknown, but rather that so many changes appear to have taken place that I have not been able to fathom the over-all regularities in these changes.

Many details have been omitted from this paper, most of which are due to changes that can be shown to have occurred later than those I have dealt with here (see Wolff (1950) and Matthews⁹ (1958)). The aim of this paper was to present the general regularities of some of the earlier sound changes and to shed some light on the phonetics of the PSi continuants.

7. In the etymologies we use the following additional abbreviations for the languages: Ioway (Io) and Wi are the CW languages, and Om, Kansa (Ka), Osage (Os), and Kwapa (Kw) are the Dh languages.

1. *háški > Hi hácki, Cr hácke, Ma háška, Da háska, Bi naské *long, tall*
2. *ištá > HiCr ištá, Da íšta, Io isdá, Om ištá, Os ištá *eye*; Ma ištá *eye, face*; Wi hišjá *face*
3. *íte > Hi i'íta, Cr íisa *his face*; Ma íta, Bi ité, OfTu ité *forehead*; Da íte *face, facial expression*; Om íde, Os ijé *face*

⁹ G. H. Matthews, *Handbook of Siouan Languages*, Ph.D. Thesis, University of Pennsylvania (1958).

4. *k'ési > Ma kes *shave*; Da k'éza, Io k'éde, Wi k'ées *scratch*
5. *k'éxi > Hi pakáaxi, Cr pakáaxe *mark by pushing*; Ma kex, Da k'éga, Io k'éxe, Wi k'éex *scrape*; Om ?áxe, KaOs k'áxe *a scraping sound*
6. *kxáhi > Ma kxah, Da xá, Os íxa, Bi axahe, Of asehi *laugh*
7. *máxe > Ma máxe *ask*; Da iwága, Os ímoxe *inquire*
8. *mní > Hi wirí, Cr wiré, MaOm miní, Da mní, Io ní, Wi ní, Os ní, BiOf aní, Tu maní *water*
9. *mníxe > Hi wírixa, Ma miníx, Bi anixi, Of anísi *play*
10. *núpa > Hi rúpa, Cr rúpe, Ma núp, DaOf núpa, Io núwe, Wi núp, Om naba, Ka naba, Os dqbá, Kw napa, BiTu nqá *two*
11. *prí > Hi ruwiri *turn*; Ma mini, Bi ní *turned, twisted*; Da mní *turn in circles*; Io brí, Wi píní, Om bđí, Ka blí, Kw pđí *turned around*
12. *rák > Ma nák, Io náge, Wi náak, Te yáká *be, sit*; Om da, Ka ya *definite article for inanimate round objects*; Os nq *singular definite article for inanimate objects*; Bi náki *sitting, curved*
13. *rámni > Hi ráawi, Cr ráawe, Ma námni, Da yámni, Io táni, Wi taaní, OmOs dábđí, Ka yáblí, Kw dápđí, Bi dání, Of táni, Tu lání *three*
14. *réhi > HiCr rée, Ma reh, Da yá, Io ré, Wi rée, OmKaOsKw dé, Bi dé, Of té, Tu lé *go, be going*
15. *rí > Hi ofíri, MaBiTu sí, DaOm-KaKw zí, Io dí, Wi zí, Os í, Of fhí *yellow*
16. *rúše > Hi rúce, Ma rúše, Da yúza, Io rúde, Wi rús, Om đuzé, Os đúθé, Bi dusí, Of tufi, Tu lusa *catch, grasp, take*
17. *rúti > Hi rúuti, Cr rúuší, Ma rút, Da yúta, Io rúde, Wi rúuč, Bi dúti, Of túti, Tu luti *eat*
18. *sáki > Hi šáki, Cr išče, Bi čaké, Of čáki, Tu háki *hand*; Da šáke *toe nail; finger nail*; Io ságe, Wi šáak *claw*; Om-KaOs šáge *hand, claw, paw*
19. *sí > Ma si, Da ší, Os ágaži *command*
20. *síhi > Hi šúi, Io sí, Wi ší *fat*; Ma síh, Bi ačí *grease*; Da ší, OmOs waší *fat meat*; Da waší *pork*; Os ší *be fat*; Bi čí, Of čí *fat, grease, oil*
21. *ské > Ma kaske, Os gaške *tie*; Da šká, Io sge, Wi šgée *loosened, untied*; Bi čké *tied*
22. *sóki > Hi šóki *broad*; Da šóka, Io sóga, Wi šoogá, OmKa šugá, Os šogá, Kw šuká, Bi čáki *thick*
23. *sóte > Hi cóota *gray*; Cr éoose *bleached, white*; Da sóta *hazy*; Io θóde *smoky*; Wi sóoč *foggy, hazy*; Om sóde *smoky*; Om sóde, Os sóje *smoke*
24. *srá > Ma saré, Wi šará *naked*; Da šdá *bald, bare, naked*; Io srá *bald, bare, smooth*; Om šná, Ka štá, Os šdá, Bi čdó *smooth*
25. *sró > Ma sro, Da sná *tinkle*
26. *srúti > Ma srút, Da šdúta *slipping*
27. *šapí > Ma šáp *chip*; Os đuzábe *peel bark off a tree*
28. *ší > Hi ící, Cr íčé *his foot*; Ma ší, Da sí, IoOs í, Wi sí, Om-KaKw sí, BiTu isí, Of íhí *foot*
29. *šíte > Hi cíta, Cr číse, Ma šut, Da

- síte, Io θíde, Wi síič, Om síde, Ka síje, Os θíje, Bi síti, Of fíite *tail*
30. *sníhi > Hi círía, Cr ċíría, Ma šínih, Da sní, Io hní, Wi šíní, Om sníte, Ka sníče, Os hníce, Bi snihi, Tu saní *cold*
31. *šóte > Ma šót *white*; Da šóta, Om šóde *muddy*
32. *sú > Hi cúa, Io θú, Bi sú, Wi súu, Of fú *seed*; Da sú *bullets, grain, seed*; Os θú *grain*
33. *šúka > Hi cúuka, Cr čúuke, Ma šúka, Da súka, Io θúge, Wi súuk, Om sága, Ka sóga, Os θóga, Kw sáka *younger brother*; Bi sqt-kaka, Tu isútk *a man's younger brother*; Of aki-fótku *Saturday*
34. *thawro > Hi taarú, Cr saaré, Da thimdó, Wi čitó, Om tinú, Ka čidú, Os cidó, Kw titú *a woman's older brother*; Io tidó, Bi tando *a woman's brother*
35. *thóhi > Hi tóhi, Ma toh *blue*; Da thó, IoOs tó, Wi čóo, Om tú, BiOf tohi, Tu tó *green*
36. *tkúša > Ma tkúš *real, true*; Da tkúsa *even, exactly, just*
37. *tʔé > Hi téé, Cr šée, Ma té, Da tʔá, IoOmKw tʔé, Wi tʔée, Ka čʔé, Os cʔé, BiOfTu té *die*
38. *wá > HiMaDaBiOf wá, IoKaOs bá, Wi wáa, Om má *snow*
39. *wáki > Ma mák, Io wáge *lying*; Da wáká *be, lie*; BiOf máki, *lie down*
40. *wáši > Hi wáacia, Cr wáačia DaWi wazí, Bi así *pine tree*; Io badí *cedar tree*
41. *wí > Hi xíiri, Ma xí *brown*; Cr xíire *gray*; Da ġí *brown, dark gray*
42. *wkáte > Hi wáakata, Da kháta, Om káde, Ka káje, Os kóje, Of akóti *plum*
43. *wmáše > Hi úuwaca, Cr úuwate, Da máza, Io máde, OmKw máze, Os móθe, BiTu mási, Of amófi *iron, metal*; Wi máas *ax*
44. *wsúke > Hi wašúuka, Cr wíške, Da šúka, Io súge, Wi šúuk, Os šóge, Kw šáke, Bi čúki, Of ačúki, Tu čóki *dog*; Om šáge, Ka šóge *horse*
45. *wtí > Hi atí, Cr aší, Ma tí, Da thí, IoBi tí, Wi číi, OmKw tí, Os cí, OfTu atí *house*
46. *wyá > Hi wirá, Cr waré, Ma mána, Da čhá, Io ná, Wi náa, OmKaKw žá, Os žó, Bi ayá, Of ičó, Tu miyá *tree, wood*
47. *wyéxe > Hi wíraxa, Ma wrex, Da čhéga, Io réxe, Wi réex, Om néxe, Ka jéxe, Kw téxe *kettle*
48. *xapí > Hi ruxapí, Cr ruxapé *pull off*; Ma xáp *peel*; Da yuǵapa *strip, pull off*; Os dixábe *skin, strip, torture*
49. *xíh > Hi xía, Ma xíh *old*; Cr xía *dim*
50. *xká > Hi xakía, Cr xačia *move*; Ma xká, Io ká *move, shake*; Da ká *shake off*; Wi káa *knock over*; Os kó, Bi ká *lean against*
51. *xóte > Hi xóota, Ma xót, Io xóde, Wi xóoč, Os xóje *gray*; Da xóta *brown, gray*
52. *xpáyí > Hi xapáa, Cr xapí, Ma xawá, Io xwání, OmOs xpáde *lost*; Da xpá *thrown down*; Wi xawaní *disappear*
53. *xró > Ma xró *ring*; Da xná *rattle, ring*
54. *xtí > Hi ihtía, Cr isáa, Ma xté *big*; Da -xčí, Io -xdi, Wi -xǵi *very, very much, genu-*

- ine*; OmKaOs -axti, Kw
 -xti *genuine*; Bi -xti *very*,
 'superlative suffix'
 55. *yási > Hi ráaši, Ma náse, Da
 čhažé, Io ráye, Wi ráaš,
 OmOs žáže, Bi yáče *name*
 56. *yátke > Hi ráta, Cr ráase, Ma nátká,
 Da čháte, Io náhde, Wi
 naǵǵgé, Om náde, Ka náje,
 Os nǵje, BiTu yáti, Of čáti
 heart
 57. *yáxu > Hi ráaxu, Cr ráaxo, Ma irex,
 Da čháǵu, Os dáxi, Bi yaxu
 lungs; Of čásu *liver*
 58. *yí > Hi šfiri, Da ží *tawny*; Cr šfire
 yellow; Ma ší, *light brown*;
 Io yí, Wi žíi *brown*
 59. *yó > Hi irúuka *meat*; Ma ró *flesh*;
 Da čhó *meat of grain kernel*;
 Io ró, Wi róo *body*; Os žu,
 Bi yó, Of ičó, Tu yúxteki
 body, flesh
 60. *yókʔí > Ma róki, Ca čhokʔí, Io rókʔi,
 Wi rookʔí, Bi yuka *bake*,
 roast
 61. *rú > Ma osú, Io yú, Wi žúu *pour*;
 Da žú, Bi čú *put, place*
 62. *yúyi > Hi irú, Ma núk, Da čhú, Io
 yú, Wi núu, OmKw žáđe, Ka
 žúwe, Os žǵđe, Bi inǵni
 a woman's older sister

WORD PLAY IN YORUBA POETRY

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The late Hans Wolff may be considered as one of the pioneers of modern stylistic studies of Yoruba Poetry. In his article *Ràrà: A Yoruba Chant*,¹ he discussed the linguistic, literary, and social characteristics of the type of Yoruba poetry known as *ràrà*. The present paper is concerned with a study of word play—a feature which is typical of Yoruba poetry in general.

Three types of word play may be distinguished in Yoruba poetry: tonal, lexical, and semantic. Tonal word play consists of a variation of tone on the same lexical item; lexical word play is play on more than one lexical item with a variation of tone, or of tone and vowel; semantic word play is play on meaning or punning.

Tonal word play consists of a variation of tone on the same lexical item without a corresponding change of meaning. For example, in the lines:

- (1) *Ohun burúkú a máa já lohun burúkú*
*Ohun búrùkù a si já lohun búrùkù*²

“Bad things will fall on bad things.
Bad things will also fall on bad things.”

tonal word play on *burúkú* *bad* gives the form *búrùkù* which in the context also has the meaning *bad*. Outside the context of this tonal word play, the word *búrùkù* itself is meaningless.

¹ Journal of African Studies, Vol I part 1, 1962.

² The illustrative material used in this paper is taken from Wande Abimbola: *Ijinlẹ Ohun Ènu Ifa* Vol. I, Collins, Glasgow 1968 Vol. II and Vol. III (mimeographed); J. O. Ajibola, *Owe Yoruba*, Oxford University Press, London 1947; I. O. Delano, *Owe L’Esin Orọ*, Oxford University Press, Ibadan 1966; O. Yemitan, *Ijala Are Ode*, Oxford University Press, Ibadan 1963; and O. Olatunji, *Collection of Ofọ* (Manuscript).

The transcription used in the text is orthographic: ọ, ẹ, ẹ represent ɔ, ɛ, ɛ and n is added to a vowel symbol to indicate nasality.

As an example (1) above (MHH contrasting with LLL)³ tonal word play consists of an opposition between tones, the most frequent being a contrast between High and Low:

- (2) *O kí mi ní pààràpọngbá*
Mo jẹ ọ ní pààràpọngbá } HHH(M)H

O kí mi ní pààràpọngbá
Mo jẹ ọ ní pààràpọngbá } LLL(M)L

“You greet me in an open place;
I answer you in an open place.
You greet me in an open place;
I answer you in an open place.”

- (3) *Èmi ò rójú apèrèmpète*
(M)HH(M)H(M)

Èmi ò rójú apèrèmpète
(M)LL(M)L(M)

“I have no time for arguments.

I have no time for arguments”

From the few examples given so far, three important features may be observed about tonal word play. The first is that it occurs within lines involving a repetition of the same structural pattern, the second is that the word being played upon occurs in an identical position within this set pattern, and the third is that as a result of this identical position, the two forms are deliberately matched. All these features are associated with ‘tonal counterpoint’ (the deliberate selection of contrasting tones in identical places in a set structural pattern where one or more lexical items are matched).⁴ In a way therefore, tonal word play may be considered a very special case of tonal counterpoint. One can compare the

³ H, M, L stand for High Mid and Low tones respectively.

⁴ For a full description of this feature, see O. Olatunji: *Tonal Counterpoint in Yoruba Poetry*, Paper given at the 8th West African Languages Congress, Abidjan, March 24–28, 1969.

tonal contrast between the lexical items *jééjéé softly* and *gìrìgìrì roughly* in

(4) *Omo onlẹ̀ tẹ̀ ẹ̀ jééjéé*

Àjòjì tẹ̀ ẹ̀ gírìgírì

"The native treads on the ground softly.

The stranger stamps on it roughly." with the High/Low contrast in (1), (2) and (3), and observe the identical position of the lexical items within the repeated lexico-structural pattern.

The essence of tonal word play is firstly to introduce tonal counterpoint on the word being played upon and secondly, to achieve a sort of emphasis by the repetition of the same lexical item with contrastive tones. The effect of the emphasis can be ascertained by attempting to repeat the lexical items without the tonal word play. For example, if

(4) *Wòròkò wòròkò ni wónón rókò*

Wòròkò wòròkò là á ràdà

"It is by bending that a hoe is made.

It is by bending that a cutlass is made."

is changed to

(5) *Wòròkò wòròkò ni wónón rókò*

Wòròkò wòròkò là á ràdà

although the meaning remains unchanged, the emphasis on the lexical item will be lost, and worse still, the matching of the High/Low contrast of the word play with the lexical (and tonal) contrast between *ókò hoe* and *àdà cutlass* will be destroyed.

Tonal word play is reminiscent of some reduplications in Yoruba where there is tonal variation e.g. *ròbòtò ròbòtò very fat* *wére wére crazy* *wùrú wùrú wùrú rough*. In

(6) *Wọ́n a kó wése wése*

Wọ́n a sì kó wése wése

Wọ́n a sì kó wèsè wese pẹ̀lú

"They will run here and there;

And they will run here and there;

And they will run here and there."

the word played upon is very much like a reduplication involving tonal variation (this is particularly true of the last line where

wèsè wese has the typical tone sequence of a reduplication), although the point of the word play is rather in the contrast between the tones of the reduplicated word in each line i.e. HM HM: LM LM: LL MM and not between the tones of the two parts of the reduplication.

Another parallel to the tonal word play in poetry is the special tonal contrast which is obligatory in a certain structure in Yoruba. In response to a request for *iwé a book*, one could say:

(7) *Íwé kọ̀; ìwè nì*

"It isn't a book; it is a book."

meaning "I am not giving you the book." Outside this structure, the form *iwè* is meaningless. The formula *X kọ̀ Y nì* obligatorily involves a sort of tonal word play where Y must have a sequence of low tones contrasting with the sequence of tones in X,⁵ although X and Y still refer to the same lexical item.

The main difference between tonal word play and lexical word play is that whereas tonal word play involves only one lexical item without any change of meaning, lexical word play involves two lexical items, each with a distinct meaning. The play on the latter is therefore not just on the tone but on the lexical items contrasted. These lexical items may be contrasted by tone, or by both tone and vowel.⁶ In

(8) *Ohun tí a fíwá lọ sí Ẹ̀kótó tí a bá lá.po Ẹ̀kòtò*

"Something we are going to Ẹ̀koto to look for and find in the pocket of the trousers."

there is a play on the contrast between *Ẹ̀kótó*—a town in Northern Nigeria—and *Ẹ̀kòtò trousers*. This is an example of two lexical items that differ only in tone.

⁵ Where X has a sequence of low tones, Y must have a contrasting sequence of high tones e.g. *òrò kọ̀; ọ̀rọ̀ nì*. *It isn't a talk*.

⁶ A consonant contrast is rare. Cf. *Àgbàla.gbà kí fí ara rẹ̀ ẹ̀ lán gbàlán gbà* *An elderly person does not make fun of himself*.

Similar examples are

(9) *Ẹni tí yó. kú yó. kú*

Ẹni tí ó. kù ó. kù

Ẹni tí ó. kù ni a kò mò

"Those that will die will die,

Those that will remain will remain,

It is those that will remain that we
do not know."

where there is a play on *kú die* and *kù remain*

and (10) *Apá ewúré ni kǐ jé kí á pa ewúré*

"The goat's front leg is what
prevents one from killing it."

where the word play is on *apá front leg* and
a pa we kill, the latter being in fact two
lexical items treated as a unit in tonal contrast
with the former.

In addition to tonal contrast, lexical word
play may involve a contrast of a single
vowel quality i.e. one or more occurrences
of the same vowel in one lexical item contrasting
with another vowel in the other
lexical item. Examples are:

(11) *Ẹni tó gbọ Ifá kò mò Ọfà*

Ẹni tó mò Ọfà kò gbọ Ifá

Bẹẹ ni Ifá tà Ọfà

"The one that knows Ifá does not
know Ọfà.

The one that knows Ọfà does not
know Ifá.

Yet, Ifá is profitable in Ọfà."

and (12) *Fomú fòmọ fòmọ fòmú; bi ọmọ
bá ti mu ọmú, kò bù ẹ?*

"Give the breast to the baby,
give the baby to the breast, as
long as the baby sucks the breast,
is that not the end of the mat-
ter?"

illustrate lexical word play involving a contrast
between only one vowel. In (11) the
word play turns on the contrast between
Ifá (an oracle) and *Ọfà* (a town) and the
vowel contrast is *i/ɔ*. In (12), the word play
is on the contrast between *ọmú breast* and
ọmọ child and the vowel contrast is *ū/ĩ*.
In

(13) *Abéré bọ lówọ adẹ.tẹ, ó dẹte*

"The needle drops from the leper's
hand and becomes a matter of con-
trivance."

the word play is on the contrast between
ẹtẹ leprosy and *ẹte contrivance*. Here, the
vowel contrast is *ε/e*, and there are two
occurrences of each vowel in the lexical
items involved.

It is clear from examples (8)–(12) that
lexical word play involves a sort of match-
ing of lexical items e.g. *kú die* to *kù remain*
in (9), *ọmọ child* to *ọmú breast* in (12). This
matching of lexical items is not peculiar to
lexical word play. It is a general feature of
Yoruba poetry. In

(14) *Ó tàpá ló.kun*

Ó tàkítì ló.sà

"He kicked in the sea;

He somersaulted in the lagoon."

tàpá kick is matched against *tàkítì somer-
sault*, and *òkun sea* is matched against *òsà
lagoon*.

One question arises in this connection:
How does one distinguish between ordinary
lexical matching and lexical word play?
It is not enough to appeal to tone. Most
cases of lexical matching also involve tonal
variation (see (14) above). Yet, not all
cases of lexical matching may be equated
with lexical word play. Example (14) clearly
does not involve any word play. It seems
clear that lexical matching can only be said
to involve lexical word play if the lexical
items involved only differ by tone or if they
differ by only one vowel (including more
than one occurrence of the same vowel).

The significance of lexical word play lies
in the lexical contrast achieved partly
through the matching of two lexical items
and partly by the tonal or tonal and vocalic
contrast between these items. The essence
of the word play is in the near similarity in
the phonological shape of the lexical items
being matched.

Semantic word play is based on multiple
meaning. It involves two kinds of puns:

(i) the use of a lexical item or collocation

of lexical items to suggest two or more meanings

- (ii) the use of two or more lexical items having the same sound but different meanings to suggest a false semantic relation between the items so used.

Puns of the first type may involve a single lexical item which in the context is capable of being interpreted as another lexical item. For example, in

(15) *Àfẹkà layée fẹnà*

the lexical item *fẹ* may be taken to mean either *like* or *blow*. Hence, the line could mean "It is liking all over that the world likes fire (i.e. Fire is universally liked)" or "It is blowing all over that the world blows fire (i.e. Fire is universally blown)". The word play is on the double meaning that may be imposed on the item.

Another example of the first type of pun is one that involves a matching of a verbal item with a fixed verb-nominal collocation in a given structural pattern. The noun in the collocation is such that it may be used by analogy to derive a false noun from the verbal item. The result of this is that the verbal item is then capable of being interpreted in two ways: either as a verb or as a verb-nominal collocation. For instance, in

(16) *Ó burú; ó bọgiri*

"He is bad."

the word play turns on the meaning of *burú*. It may be construed as having its verbal meaning 'be bad', but on account of the juxtaposition of the verb-nominal collocation *bọgiri* which in itself is a combination of *bu* (a verb of doubtful meaning probably derived from the initial syllable of *burú*) and *ọgiri* *melon seed paste*, the item *búru* may also be broken up into *bu* + *irú* *locust bean seed*. This is made more plausible by the fact that *ọgiri* *melon seed paste* and *irú* *locust bean seed* are associated with each other in the same lexical set. In the context, therefore, *ó burú* has a double meaning. It may be interpreted as 'he is bad' or 'he does something connected with locust bean seed'.⁷

⁷ For examples from prose, cf. *Ó bàjẹ; ó bàlùmò*

The second type of pun may involve two lexical items which are completely homophonous. For example in

(17) *Ọba aládé jẹgèdè tán*

Ayé ńtutùú bọ wá.o

Jẹgèdè, jẹgèdè, jẹgèdè

"The crowned king has eaten banana.

The world is becoming wet (peaceful),

Soggy wet, soggy wet, soggy wet."

the word play is on *jẹgèdè* (< *je ọgèdè* *eat banana*) and *jẹgèdè* *soggy wet*. The juxtaposition of these two items with their meanings constitutes one aspect of the word play; but another aspect of it is the possible double meaning of *jẹgèdè* in the last line. It may be taken as an adverbial item modifying *tutù* *wet* in the preceding line and therefore given its normal meaning; on the other hand, it may be taken as a repetition, or at least an echo, of 'eat banana' in the first line. This double reference and the consequent multiple meaning constitutes an important element in the semantic word play.

The more characteristic pun of the second type is the juxtaposition in the same structure of two lexical items, one a noun and the other a verb, with the verb having the same phonological shape as the final syllable of the noun. Although the noun and the verb have completely different meanings, the co-occurrence of the lexical items in the same structure and the identical phonological shape of the verb and the final syllable of the noun suggest a possible derivation of the noun from the verb with the consequent semantic relation implicit in such a derivation. For this reason, this type of pun may be labelled 'false derivative'. In

(18) *Àgbà nń gbà*

He is spoilt with play on *bàjẹ* *be spoilt* and a possible verb-nominal collocation with *àjẹ* *witch* as the noun; and *Ó yàtò; ó ya Ọjọrá* *It is different*—with play on *yàtò* *be different* and *ya Ọtò* 'separate Ọtò' Ọtò and Ọjọrá are names of two areas in Lagos).

"It is the adult that accepts (the greatest responsibility)"

the two lexical items being played upon are *àgbà adult* and *gbà accept*. Owing to the identical form *gbà* in both items, the noun *àgbà* looks as if it is connected with, and possibly derived from, the verb *gbà* although this is not the case. The effect of this false association is the suggestion of a semantic relation between the two items. The noun has its normal meaning 'adult'; in addition, there is the meaning, by implication, in the reference to its possible relation to the verb *gbà accept*. It is all these that constitute the word play.

The false derivative in (18) may be compared with a true derivative in

(19) *Ìbí kò yàtò sí ìbí*

Bí a tí bí ẹrú ní a bí ọmọ

"Birth is not different from birth:

It is the way a slave is born that a child is born too."

Here, the noun *ìbí birth* is derived from *bí give birth to* and the two lexical items are therefore semantically related. (19) does not constitute a case of punning because it is the same verb (with the same meaning) that is contained in the final syllable of the noun.

The pun involving a false derivative is found most commonly in Incantations (*Ọfọ*) in Yoruba poetry. It is so common that it may be regarded as a diagnostic feature of this type of poetry. The difference between the occurrence of the false derivative in Incantations and in other types of poetry is that, in the latter, the punning is intended to be clever or humorous.

(20) *Bí kò sí ohun tí ó ẹ ẹsẹ, ẹsẹ kǐ ẹ*
 "Unless something were to happen to a fist, it cannot be broken."

is an example of clever punning with *ẹsẹ fist* and *ẹ break*.

(21) *Orógbó nǐ gbó wọn sáyé*

Obì nǐ bì wọn só.run

"It is the bitter kola that makes one live long;

It is the kolanut that pushes one to heaven."

is a humorous pun on *orógbó bitter kola* and *gbó be mature* and on *obì kolanut* and *bì push*.

The puns in Incantations, however, are used in a symbolic way. Incantations are used to achieve specific effects and the names of objects selected are such as to be symbolic of the action required. For example, in

(22) *Edé ló ní ó dé*

"It is the shrimp that asks him to arrive."

the desired end is that someone should arrive (*dé*), the symbolic object selected is *edé shrimp*.⁸ This is based on similarity of sound and, consequently, the false notion that there is a semantic relationship between the noun and the verb i.e. that in addition to the meaning 'shrimp', the noun has some additional meaning connected with 'arriving'. The word play is still the same (i.e. it is based on the double meaning derived from the false derivation), but its function is symbolic. Similar examples of symbolic word play are:

(23) *Iré ló ní kí ẹ bá mi rẹ*

Iyò ọpẹ ló ní kí ẹ mǎa yò mọ mi

"It is the iré leaf that says you should be friendly with me.

It is the palm frond that says you should accept me with joy."

and (24) *Àkọ ló ní kí wọn ó kọ ọ*

Kòṇkò ló ní kí wọn ó kọ ọ

"It is the grey heron that says he should be rejected.

It is the frog that says he should be rejected."

In (23), the word play is on *iré a kind of leaf* with the suggestion of a semantic relation to *rẹ be friendly*, and a similar relation between *iyò palm frond* and *yò rejoice*. In (24), the word play is on *àkọ grey heron* and *kòṇkò frog* on the one hand, and *kọ reject* on the other. In both cases, the implied derivation and semantic relation is

⁸ The symbolic object will in all probability be an ingredient of the herbal preparation to be used in conjunction with the incantation.

a false one, but the symbolic effect is obvious.

A close study of the three types of word play shows that their effect derives from similarity or difference of sound and meaning. This may be shown in the following table:

WORD PLAY	Sound	Meaning
Tonal	Different	Same
Lexical	Different	Different
Semantic	Same	Different

The role of sound in word play may be further specified by differentiating it into segmental sounds and tone i.e.

WORD PLAY	Segmental Sounds	Tone
Tonal	Same	Different
Lexical	Different/Same	Different
Semantic	Same	Same ⁹

This table shows that word play is characterised largely by sameness of segmental sounds and difference of tone. The latter feature is an aspect of tonal counterpoint which characterizes the matching of lexical items in lexico-structural patterns. Advantage is often taken of the fact that the Yoruba language has many lexical items which differ only in tone. Such lexical items provide ready material for lexical word play. In

(25) *Ọtẹ ni ọjò, ọtẹ ni Ọjó*

"The rain is one thing, Ọjó is another."

⁹ Tone differences in false derivatives are ignored in this scheme because most of them are predictable e.g. in *ikà á ka oní.kà*, *cruelty will redound on the cruel person*, the change of *kà* to *ka* is a change of verb before an object. Cases that are not predictable are not common e.g. *Agbe ní gbére pàdé òkun* *The agbe bird is the one that carries good luck to the ocean* where the word play is on *agbe* the *Blue Touraco* bird and *gbé* carry.

the tonal contrast between *ọjò* *rain* and *Ọjó* *personal name* is exploited in the word play. (See also (8) and (9)).

Sameness of segmental sounds means that in the word play, the same syllable may recur several times especially where the words being played upon are also repeated. In

(26) *Ó nká mi lẹ.gèdẹ*

Ó nká mi lǎwùsá

.....

Ó pòdòyì ká

Ó bá wọn dǒ.de Ìkǎ

Ó bá wọn níbí tí

Wọn gbé níforí ọkǎá hómú

"He is plucking my banana,

He is plucking my *awùsá*,¹⁰

He is loitering around.

He went with them to *Ìkǎ* town.

He met them where

They were scratching their nose with the head of the Gaboon viper."

there are five occurrences of the syllable *ká*; the first two are repetitions of the lexical item *ká* *pluck*, the others are *ká* *round*, and the *ká* syllable in *Ìkǎ* (place name) and *ọkǎ* *Gaboon viper* respectively. The word play is of the semantic type involving a pun on these four lexical items. A similar example is

(27) *Arábá ni bàbá*

Àrǎbà ni baba

Ènì a bá lǎbà ni bàbá

Ènì a bá nínú ahèrè ni baba

.....

Ta ni baba erinwo?

Àrǎbà ni baba erinwo

"The silk cotton tree is the father.

The silk cotton tree is the father.

The one we meet in the farm-hut is the father.

The one we meet in the farm-hut is the father.

Who is the father of erinwo tree?

The silk cotton tree is the father of erinwo tree."

¹⁰ *awùsá* is the fruit of *Tetracarpidium Conophorum*.

In this passage, there are two types of word play: tonal word play on *Àrâbâ* and *Arábâ* *silk cotton tree*, *bâbâ*, *baba* *father* and semantic word play on *bá* *meet* and *abâ* *farm-hut*. There are eighteen occurrences of the *ba* syllable. This large number is due to the shape of the word *bâbâ/baba* which accounts for twelve of the eighteen occurrences. But even when allowance has been made for this, there are still six other occurrences of the syllable *ba* which may be traced to three different lexical items.

Examples such as (26) and (27) may lead to the false conclusion that the word play is on sounds or on a particular syllable. Such a conclusion will be misleading because, as has been demonstrated above, the repetition of the same syllable is inherent in the

exploitation of sameness of segmental sounds in word play. Besides, the other component of sound in word play is meaning; there can be no word play without an associated meaning.

It has been shown above that word play is a characteristic feature of Yoruba poetry and that it is based on similarity or difference of sound and meaning. The various types have different functions: tonal word play is mainly used for emphasis, lexical word play to reinforce lexical matching (including lexical contrast) and semantic word play is used for clever, humorous or symbolic punning. All these functions are of stylistic or poetic significance in Yoruba poetry.

SOME QUESTIONS ON THE CLASSIFICATION OF AFRICAN LANGUAGES

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Undoubtedly Greenberg's most striking and significant innovation in *The Languages of Africa* (1963), a revision of *Studies in African Linguistic Classification* (1955), is setting up the Nilo-Saharan family, composed of all those languages and language groups which in the earlier work were not included in the Afro-Asiatic (Hamito-Semitic), Khoisan or Niger-Congo families, except Kordofanian, which was grouped with the latter to form Niger-Kordofanian, the second most important innovation of the revised edition.¹ The other two families (Afro-Asiatic and Khoisan) remain essentially as they were before. The six branches of Nilo-Saharan are Songhai, Saharan, Maban, Fur, Coman, and Chari-Nile (known in the earlier edition as Macro-Sudanic), unquestionably the largest and most diversified of the six, consisting of four sub-branches, Kunama, Berta, Central Sudanic, and Eastern Sudanic, which, likewise, is the largest and most diversified of the four, consisting of Nilotic (including so-called Nilo-Hamitic), Nubian, and eight smaller and less well known sub-groups, Murle-Didinga, Merarit, Dagur, Ingassana (or Tabi), Nyima, Temein, and Nyangiya; in the earlier edition (1955) Nyima was not mentioned, while the last two were tentatively treated as completely independent families.

Greenberg has made a serious effort to document and justify his groupings by pro-

viding a number of comparative word and morpheme lists: namely, the Eastern Sudanic comparative word list of 131 items (p. 95 ff.), the Chari-Nile comparative word list of 106 items (p. 117 ff.), 46 Eastern Sudanic and Chari-Nile morphological elements (p. 109 ff.), and 29 Nilo-Saharan morphological elements (p. 130 ff.). The compared forms, similar in both sound and meaning (or grammatical function), are presumably cognates, but may in some cases be borrowings or fortuitous resemblances. A careful examination of this evidence, however, does not support the view either that Eastern Sudanic is a valid branch within Chari-Nile or that Chari-Nile is a valid branch within Nilo-Saharan. In the earlier edition (1955) Greenberg maintains that "where the families given as independent turn out to be related at a more remote level, as in the case of Macrosudanic [i.e. Chari-Nile] . . . one could assemble a small number of etymologies cutting across families. Thus, since Macrosudanic consists of Eastern Sudanic, Central Sudanic, Berta, and Kunama, one might quote etymologies to show that, say, the Nubian branch of Eastern Sudanic is related to the Moru-Madi branch of Central Sudanic. Such etymologies would never be as large in number as those relating Nubian to other branches of Eastern Sudanic or Moru-Madi to other branches of Central Sudanic. It would not be possible, moreover, to show that Nubian (Eastern Sudanic) and Moru-Madi (Central Sudanic) form a distinct family as opposed to, say, a family consisting of Nilotic (Eastern Sudanic) and Mangbetu (Central Sudanic). In this sense, cross-cutting is not possible." (p. 108 fn. 1.).

Since many of the items in the Eastern Sudanic word list recur in the Chari-Nile word list, it is an interesting test of Green-

¹ For information on the location and geographical distribution of these language families and the individual languages which they comprise, one should consult, in addition to Greenberg's work, Westermann and Bryan's *Languages of West Africa* (1952) and Tucker and Bryan's *Non-Bantu Languages of North East Africa* (1956), nos. II and III of the *Handbook of African Languages*. Both contain excellent maps.

berg's claim to note how often the non-Eastern Sudanic branches of Chari-Nile (i.e. Central Sudanic, Kunama and Berta) would appear in the Eastern Sudanic word list, which should be expanded by five items from the Chari-Nile list (nos. 18, 55, 60, 62, 64), since each contains citations from two or more branches of Eastern Sudanic. If Eastern Sudanic were a valid group within Chari-Nile one would expect the non-Eastern Sudanic branches of Chari-Nile to occur with decisively lower frequency than the Eastern Sudanic languages. This is far from being the case, however. Nilotic and Nubian do occur very frequently (110 and 93 times respectively) and, in fact, co-occur far more frequently (73 times) than any of the eight smaller groups occur at all. None of these appear as frequently as would Central Sudanic, only one, Murle-Didinga, appears more frequently than would Kunama, and of the remaining seven, only Barea and Merarit appear more frequently than would Berta. (The precise figures are given in Table I-A.)

Applying the same procedure to the Chari-Nile morpheme list, in which Eastern Sudanic forms are grouped together, we find that Central Sudanic would appear more frequently among the Eastern Sudanic citations than do any of the smaller Eastern Sudanic groups except Murle-Didinga, and that only Murle-Didinga, Barea and Merarit appear more frequently than would Kunama. All except Nyangiya appear more frequently than would Berta, however. Thus while all the members of Chari-Nile are probably related (the evidence is not equally strong for each of them, however, and is particularly weak for Nyangiya, which appears only ten times in the word list and not at all in the morpheme list), there is insufficient evidence that Eastern Sudanic forms a distinct genetic sub-group within it.

Let us, therefore, tentatively treat each sub-group of Eastern Sudanic as an independent branch of Chari-Nile, except for Nilotic and Nubian, which seem to merit being treated as a single branch. This pro-

cedure would permit merging the Eastern Sudanic and Chari-Nile word lists, omitting only those items which are exclusively Nilotic and Nubian, but adding 23 new items

TABLE

Column

- I-A Number of times each Chari-Nile branch would appear in expanded Eastern Sudanic word list.
- I-B1 Number of times each Nilo-Saharan branch would appear in expanded Chari-Nile word list.
- I-B2 Number of times each Nilo-Saharan branch would appear in combined Eastern Sudanic-Chari-Nile morpheme list.
- II-A Number of times each Eastern Sudanic or non-Eastern Sudanic branch of Chari-Nile would appear in the expanded comparative Chari-Nile word list independent of any (other) branches of Chari-Nile.
- II-B Number of times each Chari-Nile or non-Chari-Nile branch of Nilo-Saharan would appear in their comparative Nilo-Saharan word list independently of any (other) branches of Chari-Nile.

	I-A	I-B1	I-B2	II-A	II-B
Nilo-Saharan					
Saharan	—	64	13	—	78
Maban	—	43	9	—	12
Songhai	—	42	6	—	15
Fur	—	35	5	—	4
Coman	—	31	2	—	6
Chari-Nile					
Central Sudanic	51	90	17	4	6
Kunama	34	55	10	1	2
Berta	23	40	2	4	0
Eastern Sudanic					
Nilo-Nubian	126	143	42	23	6
Murle-Didinga	44	49	21	2	1
Barea	34	37	16	0	0
Merarit	31	32	12	0	0
Ingassana	21	22	7	1	0
Dagu	15	15	10	0	0
Nyima	15	15	7	0	0
Nyangiya	10	10	0	0	0
Temein	7	8	9	1	0

from the Nilo-Saharan word list, in which two or more branches of Chari-Nile are represented. Since many of the items in this combined list recur in the Nilo-Saharan list and all but two items in the Nilo-Saharan

comparative morpheme list contain citations from the Chari-Nile list, let us apply the same procedures as above to determine whether there is adequate evidence that Chari-Nile is a valid genetic branch within Nilo-Saharan. (The numerical results are given in Tables I-B1 and I-B2.)

Of the non-Chari-Nile members of Nilo-Saharan (i.e. Saharan, Maban, Songhai, Fur and Coman), Saharan would appear more frequently on the Chari-Nile word list (expanded by the above-mentioned 23 items), than all Chari-Nile groups with the exception of Central Sudanic and Nilo-Nubian (i.e. Nilotic plus Nubian); Songhai and Maban would appear more frequently than all of the remainder except Kunama and Murle-Didinga; of those still remaining, only Berta and Barea would appear more frequently than Fur. Merarit would appear only one more time than Coman, and all the rest less. Applying the same procedure to the Chari-Nile comparative morpheme list, we find the evidence slightly stronger in favor of the validity of Chari-Nile, but still far from conclusive. Four Chari-Nile groups, Nilo-Nubian, Central Sudanic, Murle-Didinga and Barea appear more frequently than would Saharan, an additional three, Merarit, Kunama and Dagu appear more frequently than would Maban, while all but Berta and Nyangiya appear more frequently than would Songhai, Fur and Coman. On the basis of the above evidence it would seem that Chari-Nile is scarcely a more valid linguistic entity within Nilo-Saharan than is Eastern Sudanic within Chari-Nile.

It is possible to look at the evidence of the word lists in another way, however; namely, if Eastern Sudanic were a distinct branch of Chari-Nile one would expect each of its sub-groups to appear on the combined Eastern Sudanic Chari-Nile word list independently of all the other sub-groups (i.e. as the sole representative of the whole branch) significantly less frequently than the remaining branches of Chari-Nile would appear independently of Eastern Sudanic. This is

hardly the case, however, but the numerical results (given in table IIA) are very inconclusive. Applying the same procedure to Chari-Nile vis-a-vis Nilo-Saharan we do find evidence for positing that the Chari-Nile languages are more closely related to one another than to Saharan; the evidence is weaker for Songhai and Maban and virtually nil for Coman and Fur. (The numerical results are given in Table IIB.) The same procedure cannot legitimately be applied to the morpheme lists because these are constructed with Eastern Sudanic as a point of departure, so that all Chari-Nile and all but two Nilo-Saharan morphemes have Eastern Sudanic counterparts.

There may, of course, be additional material available to Greenberg, but not included in these lists, which could rectify to some extent the under-representation of certain languages or language groups. Furthermore, some languages are so little documented (e.g. Nyima, Nyangiya, Temein) that their infrequent appearance is very inconclusive. Finally, on probabilistic grounds alone, a language group which has a large and diversified set of members (e.g. Central Sudanic) will appear on such a list with greater frequency (other things being equal) than a language group consisting of a single member (e.g. Kunama). In fact, it is the larger groups which generally appear more frequently in these lists than the smaller.² Nevertheless, even if complete data were available for all the languages concerned and the most sophisticated statistical methods were used, it is difficult to see how purely quantitative evidence such as contained in these lists, unless it is overwhelming could

² It is interesting in this connection to recall that Huntigford in *The Nilo-Hamitic Languages* (Southwestern Journal of Anthropology, 12: 1956) points out 23 instances (i.e. only three times less than Berta) where the extensive and highly diversified Cushitic family (a branch of Hamito-Semitic) would appear in the ninety-item Chari-Nile (i.e. Macro-Sudanic) word list in Greenberg's earlier edition. The list has been expanded and revised, however, in the new edition.

provide an accurate guide to linguistic sub-grouping in the absence of fairly rigorous means not merely of excluding borrowings and chance resemblances, but, more important, of identifying true cognates which have diverged phonologically or semantically beyond obvious similarity. Such means are not even remotely available for the Nilo-Saharan languages. Even if they were, however, lexico-statistical methods in themselves can hardly be an adequate means of establishing linguistic sub-groups, for, as Greenberg himself has pointed out "the problem of subgrouping . . . is the recognition of the existence of a set of changes common to a particular sub-group which has occurred between the period of divergences of the family as a whole and that of the sub-groups in question," (*Essays in Linguistics: The problem of linguistic subgroupings*, p. 49), and, more specifically, "the mere counting of the number of cognates shared, without attention to morphological or phonologic evidence and without consideration of the general distribution of each form for its bearing on the question of innovation, is a relatively crude method of discovering subgroupings which disregards much relevant evidence," (*ibid.*, p. 54). Unfortunately, Greenberg makes no attempt to justify his groupings within Nilo-Saharan on the basis of these considerations, nor are they at all evident in his material.

Since the status of Eastern Sudanic as a distinct branch within Chari-Nile proved highly suspect once evidence for the relation of its members to the remaining Chari-Nile languages was presented and the same proved true of the Chari-Nile languages themselves vis-a-vis the remaining Nilo-Saharan languages, might not the status of Nilo-Saharan as a distinct family and even that of Niger-Kordofanian, likewise, prove doubtful if important affinities were demonstrable between the languages grouped in these two families. This suggestion is much more speculative,

but not without supporting evidence. Westermann in *Die Sudansprachen* (1911) presents some very interesting material in the form of a comparative word list, much like Greenberg's, connecting three East African languages, Nubian, Kunama, and Dinka (a Nilotic language) with five from West Africa, Twi, Gan, Ewe, Yoruba and Efik. Greenberg classifies the former as Chari-Nile and the latter as Niger-Congo, maintaining that, "whereas the five western languages occur in all of the lexical comparisons, the eastern languages are cited far less frequently, and the majority of these examples are unconvincing. From this it is clear that the five western languages form part of some real unity, while the eastern languages if related at all, display a connection of a more remote nature" (*The Languages of Africa*, p. 5).

Actually, one or more of the Eastern languages is represented in 221 of Westermann's 323 items; some indeed, are unconvincing,³ but there are at least 54 convincing items containing citations from Kunama and one or both of the others. It should be noted that Greenberg bases the relation of Kordofanian to Niger-Congo on a word list of 52 items. To be sure, some of the Kordofanian languages have noun class systems very reminiscent of those in Bantu and other Niger-Congo groups both in their general grammatical behavior and even in the semantic categories which they represent, to the extent that these can be specified. Actual relationships between the noun class affixes of Kordofanian and those of Niger-Congo, however,

³ It is difficult if not impossible to avoid subjectivity in determining what constitutes similarity in sound and meaning. I must confess that not all of Greenberg's examples strike me as convincing, and until some fairly objective criteria of acceptability are devised it will be difficult to evaluate the merit of Greenberg's lists as compared with that of Westermann. In fairness to Greenberg, I should add that his examples almost never struck me as implausible on semantic grounds, while Westermann's did in a number of cases.

have up to now been largely conjectural.⁴ On the other hand, the only important morphological resemblance connecting the Eastern and Western languages in Westermann's material is a prefix *a-*, which forms nouns from verbs and occurs in all five western languages as well as Kunama and Dinka. Westermann does, however, attempt to reconstruct proto-forms, in general prematurely, but in some cases based on quite striking and unusual sound correspondences. For example, in nos. 246-249, an Ewe form with initial *nl* corresponds to Eastern forms with initial *g*. Thus, Ewe *nlo be*, Nubian *agor*, *agar to forget*; Ewe *nlo*, Dinka *gor write, scribble*; Ewe *nlo me hard hearted*, Dinka *guor to take revenge*; and least convincingly, Ewe *nlo to roll up*, Kunama *gu gu to be bundled*. In the first and the last examples there are corresponding Yoruba forms with *gba*.

Finally, it is worthwhile taking a somewhat closer look at the technique of 'mass comparison', on which Greenberg's method largely rests, and which he explains as follows, "the likelihood of finding a resemblance in sound and meaning in three languages is the square of its probability in two languages. In general, the probability for a single language must be raised to the ($n-1$ th) power for n languages Hence, the presence of a fair number of recurrent sound meaning resemblances in three, four or more languages is a certain indication of historical connection" (Essays in Linguistics: Genetic Relationship among Languages). Though intended, in principle, to exclude chance as an explanation of widespread similarities in

sound and meaning, this reasoning would also, in practice, exclude borrowing in the case of fundamental vocabulary items, since these, although sometimes borrowed by an individual language, are almost never borrowed, in contrast to 'culture words', by many languages from a single source.

Nevertheless, resemblances in fundamental vocabulary among a group of languages need not always imply the interrelatedness of all of them. For example, if two unrelated languages share a certain number of resemblances in fundamental vocabulary, whether due to chance, intimate borrowing, or both, these will be passed on to the descendants of each as they split up first into dialects and ultimately language families. Some of these forms will gradually be replaced or altered unrecognizably, but the number that will recur in, let us say, three, four, or more languages, although it will decrease with time, will not be appreciably less for a protracted period than the number recurring in the two original ones. Widespread similarities of this kind imply the interrelatedness of some, but not necessarily all, of the languages sharing them.

Furthermore, the probability of finding forms similar in sound and meaning varies with the degree of similarity between them. If three forms are cited, one of them may be more similar to each of the other two than these are to each other. The more forms which are cited, the further apart may be the two most dissimilar ones, and the further apart these are, the greater the likelihood that some additional form from another language will resemble one of them. As an example, let us take no. 78 from the Eastern Sudanic word list with the meaning *mouth*: *akkei*, *ak*, *ag*, *agil*, *oglu*, *aulo*, *kul*, *ngala*, *nal*. It would be impossible to calculate the probability of such a set of resemblances. Furthermore, by means of the last citation we could connect these with the synonymous forms in no. 34, of the Niger-Congo list:

⁴ The interrelationship of the Kordofanian languages as well as their relationship to other language groups is not a completely settled question, but it is outside the scope of this article. Particularly dubious is the relationship of the Kadugli-Krongo group to the remaining Kordofanian languages. The most thorough treatment to date is Stevenson's *Linguistic Research in the Nuba Mountains*, parts I and II (Sudan-Notes and Records, 43-4: 1962-3).

nyen, nyã, nyo, nu, nwa, mu, mwa, etc. To be sure, proven cognates are often equally disparate, if not more so, but their relationship is established by phonetic correspondences and other demonstrable historical linguistic processes, not by mere 'similarity' in sound and meaning.

In summation, it should be emphasized that this paper has not disproven a single aspect of Greenberg's classification, much less offered alternatives. It has simply attempted to show that many of the problems have not been definitively solved, and that much investigation is still necessary.

SOME GENERALIZATIONS CONCERNING GLOTTALIC CONSONANTS, ESPECIALLY IMPLOSIVES

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1.1. J. C. Catford, in a now classic paper (1939) distinguished two types of glottalic consonants: (1) ejectives (or explosives) involving the raising of the larynx and the subsequent expulsion of the air compressed in the supraglottal cavity, and (2) injectives (or implosives) utilizing the opposite mechanism of lowering the larynx, thus rarefying the air in the supraglottal cavity so that, on release of the oral closure, an ingressive flow of external air is immediately succeeded by egressive lung air.

For purposes of the present study of these two classes of sounds, approximately 150 phonological descriptions have been examined.¹ This sampling is perhaps close to exhaustive for the implosives with which this paper is more particularly concerned. For the more widely distributed ejectives, the sample is far less complete. The appended bibliography lists all the sources consulted whether cited in the body of this paper or not.

1.2. A more thorough review of the literature at a later stage of the study showed that some of the conclusions regarding implosives had been anticipated by Haudricourt (especially 1950). Reference is made to those conclusions where appropriate. The present study is perhaps still of interest even for these questions, since it presents additional data not considered by Haudricourt, whether because they referred to language outside his area of specialization (Southeast Asia) or because their appearance was subsequent to his publications. This evidence serves to confirm the essential correctness of prac-

tically all his theses. Wang (1968) also presents some generalizations regarding both implosives and ejectives, some of which likewise duplicate Haudricourt's conclusions without citing them. This work appeared subsequent to my earlier investigations. Like Haudricourt's hypotheses these are also in basic agreement with my own observations and are cited where appropriate.

1.3. The approach employed here may be called 'processual'. Besides its possible substantive interest, the present study is designed to illustrate further the methodology outlined and exemplified in Greenberg (1969). In accordance with this approach, the article consists of two main sections. The first is essentially synchronic, while the second sets forth dynamic and comparative evidence bearing on the more typical diachronic processes in which glottalic consonants participate. The division is not rigid since it has not been possible, even had it been desirable, to segregate completely the synchronic and diachronic factors.

In the following section (2) a number of important respects in which generalizations concerning ejective and implosive consonants are distinguishably different, or indeed, in some instances, involve polar oppositions, are considered. These include the temporal relation between oral and glottal releases, the relation to voicing, preferences regarding point and manner of articulation, effect on the pitch of adjoining vowel segments, and marked-unmarked relations to the plain series.

¹ The research on which this paper is based was carried out as part of the NSF Project on Language Universals (Grant No. GS-1880) at Stanford University. This support is gratefully acknowledged. I am also grateful for the assistance of Dorothy Kaschube in earlier phases of this work.

2.1. The phonological opposition in individual languages between ejectives and injectives applies effectively only to obstruents, and is neutralized for sonants and

semi-vowels. The typical ejective obstruent is unvoiced and has abrupt onset (i.e. is a stop or affricate). Segments with this latter property will be referred to as non-continuant. These are the sounds commonly referred to as 'glottalized' in phonetic descriptions. The typical injective obstruent is, on the other hand, a voiced stop.

For the obstruent ejective, as is often pointed out in the phonetic literature, the glottal occlusion is normally released after the oral occlusion. For example Hockett (1955, 33) observes that "typically the oral closure is released first . . . and then the glottis is opened." He goes on to point out, "But various timings are possible, and various degrees of pressure before release." This situation is mirrored in the most common phonetic symbolization of this class of sounds, e.g. [p'] in which the glottalization symbol follows that of the oral articulation. Not uncommonly in phonemic analyses glottalic ejectives are analyzed as phonemic sequences of an unvoiced obstruent and a glottal stop. In such cases the glottal stop symbol is invariably written second.

The opposite situation obtains in regard to the imploded obstruents. As Ladefoged (1968) correctly indicates, there are no less than three related phonetic possibilities, truly implosive sounds in which the larynx is lowered and ingressive air follows the oral release, sounds with laryngealized voicing, and preglottalized sounds. These may be symbolized as ɓ, ɓ̥, and ʔb respectively. However, there are a number of reasons why, in spite of their phonetic distinguishability, they have to be considered as variants of the same basic type. Both phonetic and phonological considerations enter. For the first two of these three possibilities, implosives and laryngealized sounds, as Ladefoged himself points out, where there is implosion it is often accompanied by laryngealized voicing and where there is laryngealized voicing there is often simultaneous implosion, although 'pure' realizations of both types do occur.

For West Africa, Ladefoged cites Hausa as a typical example of a language with laryngealized voiced consonants (e.g. ɓ̥). However, an earlier instrumental phonetic study of the Hausa sounds in question (Von Essen 1962), showed as one of its results that there was consistently negative oral pressure indicating actual implosion.

As for the distinction between laryngealized and preglottalized sounds, we are in an even more difficult situation, if we wish to assign languages to one or the other type with consistency. As Ladefoged points out (1968, 16) "Because I have not been able to distinguish consistently between voiced consonants with accompanying glottal stop and similar consonants marked by laryngealization, I have symbolized both by a prefixed ʔ." Hence, Ladefoged in his phonemic inventories of West African languages distinguishes two, not three, sound types, and even here it is noted that for Kambari, there is free variation (1968, 60).

Even if one wished to distinguish two types, the implosive and the preglottalized/laryngealized, this would not be possible from the existing literature, with the exception of the examples listed in Ladefoged (1968). Even accomplished practical phoneticians have chosen to ignore these differences. Thus Westermann and Ward (1933) recognize only one sound type symbolized ɓ etc. Much more recently, Tucker and Bryan (1966), treating of the languages covering a vast area within Africa and with a large explicit apparatus for symbolizing phonetic types, lump all examples under such transcriptions as 'b. Crazzolara (1960, 5) goes so far as to say, "Consonants preceded by a glottal stop have also been called 'implosive consonants'."

Outside of Ladefoged's recent book, the only sources which distinguish more than one phonetic type occur in the reports of field workers with SIL training. In these accounts the differences are never distinctive. Sometimes there is free variation. In Southeast Asia, Thomas (1962) describes pre-

glottalized and implosive consonants in free variation in Chrau, while Smalley (1954) indicates that in Sre there is free variation between preglottalized and laryngealized realizations. The fact that in the French literature on this area these sounds are uniformly described as preglottalized shows once more that a clean separation is not obtainable on the basis of existing accounts.

In other instances, most conspicuously for the Mayan languages, there is conditional variation in which characteristically, preglottalized variants occur intervocalically and implosive and laryngealized types initially. An example is Aguacatec (McArthur, H. and L., 1956) with *ʔ* initially and *b* intervocalically. In Movima (Judy, R. and J. E., 1962), a language of Bolivia, implosive actualizations are described for initial and preglottalized for medial position.

There is thus no evidence, as far as can be seen, of phonologically distinctive contrast among laryngealized, preglottalized, and implosive obstruents. This is likewise the conclusion of Ladefoged (1969, 19), "... in fact no language uses the difference between these possibilities." Just as importantly for present purposes, it seems that all the generalizations to be discussed in subsequent sections apply equally to all these types. However, the possibility of distinctive opposition within a language or differences in respect to relevant generalizations should not be completely foreclosed in view of the presumed future accumulation of more exact phonetic information.

Because of these equivalences, the term 'injective' will be used as a cover term for all three phonetic types where their distinction is not relevant, and such symbolizations as *ʔb*, *ʔd* will be used for typographic convenience except where the phonetics is the explicit topic of discussion.

The foregoing discussion has been concerned exclusively with obstruents. Glottalic sonants resemble injective obstruents in that they tend to preglottalization. An implosive sonant is presumably a phonetic impossibil-

ity. There is, however, for sonants the same phonetic ambivalence and phonological equivalence between laryngealization and preglottalization which has been noted for obstruents, and here also there is presumably no hard and fast phonetic boundary between the two. Similarly free or conditional variation among the various phonetic types is sometimes reported. Thus for Khmu, an Austroasiatic language, Smalley (1961) notes free variation between actualizations which he symbolizes as *m̥* and *ʔm̥* and which he analyzes phonemically as a sequence of glottal stop and sonant. In a well-known paper, Sapir (1933) described how for his Nootka informant, sonants with glottal preceding oral release and the ordinary obstruent glottalic pressure stops with glottal release following oral release, were of the same type, so that having learned to write according to the then prevalent transcription *p!*, *t!*, etc., he spontaneously wrote *m!*, *n!*, etc. also, contrary to phonetic fact. It will be shown later that glottalic sonants, which are probably from the phonetic point of view the same type everywhere, may be functionally or historically the glottalic equivalents of either injective or ejective obstruents, depending on the language.

2.2. The next question to be considered is that of voicing in relation to glottalic consonants. Once more obstruents and sonants have to be considered separately. The ejective obstruent appears always to be unvoiced. Indeed voicing for these sounds is probably a phonetic impossibility. On the other hand, for all the varieties of injective discussed in the preceding paragraph, preglottalized, laryngealized, or true implosive, voicing is normal. For this reason Wolff (1959) in his feature analysis of a set of Nigerian languages utilizes a single feature, glottalic, for both injectives and ejectives and distinguishes them by the presence of the features voiceless and voiced respectively. The present writer in an early discussion of Hausa phonology, treated ejectives and injectives as members of the same series (Greenberg, 1941).

However, voiceless implosives do occur. With the exception of most Munda languages, which have a full set of four injective unvoiced stops in final position, they are practically always bilabial and, as will be shown later, this is the preferred point of articulation for implosives in general. In most forms of Maya, a single implosive bilabial phoneme is found with a variety of allophones, voiceless, voiced, and sometimes nasal or with a nasal release. The unvoiced allophone occurs typically in final position, e.g. in the stress group (Aguacatec, McArthur 1956), or in syllable final (Chontal, Keller 1958, and Pocomchi, Mayers 1960). In Tojolabal (Supple and Douglass 1949), the bilabial implosive is voiceless in all occurrences. In still other forms of Mayan, e.g. Tzeltal (Berlin 1962), the bilabial implosive is voiced in all its manifestations. It seems then that voicing contrast for the bilabial implosive is never distinctive in Mayan. However, a few Mayan languages have a contrast between an ejective *p'* and an implosive in the same position. When this occurs the implosive is generally voiced in all its realizations so that a contrast based solely on injection versus ejection without accompanying voicing contrasts does not usually exist. Examples of this situation are furnished by Tsotsil (Weathers 1947), Chorti (Mayers 1966), and Mopan (Mayers 1966).

However, it seems that in Chontal (Keller 1958) a voiceless bilabial implosive does contrast with a voiceless ejective in word final. In other positions the co-allophones of the implosive are voiced nonimplosive stops.

Iraqw, a southern Cushitic language (Whiteley 1958), like some Mayan languages, has a bilabial implosive which is devoiced in word final. This is also reported for Basa, a Bantu language of Cameroun (Bôt Ba Njock 1962). Unvoiced bilabial implosives are likewise found in Mangbetu and in Lendu, both Central Sudanic languages, according to Tucker and Bryan (1966). Both these languages are described as having

voiced bilabial implosives, but existing sources do not show whether there is a contrast.

There remains, however, one reported but doubtful instance of which I am aware in which there is a voicing contrast in an implosive consonant. This is Igbo, in which Carnochan (1948) and subsequently other investigators report that the consonants written *kp* and *gb* in the standard orthography are velarized bilabial implosives differing only in voice. However, Ladefoged (1966, 11) notes that "... only Igbo has *ɓ* (but not *gb*) in contrast to *kp*" thus suggesting that there is a further difference in the presence of a velar occlusion in the voiceless member of the opposition.

A contrast between voiceless and voiced true labial velars, both described as implosive, is reported by Knappert (1962) in regard to Alur, a Western Nilotic language. However, as will be mentioned in later discussion, it is at the least doubtful whether sounds described as implosive labial velars should be included in the group of sounds which forms the topic of the present paper, since they involve a velaric airstream.

An instance was noted of a voiceless implosive without a bilabial component, once more from Igbo, for the Owerri dialect (Armstrong) and for a dialect of the same group, in Swift, Agaghotu, and Ugorji (1962). Both these sources describe an implosive voiceless dental. An earlier source, Ward (1936), describes the Owerri dialect as having the common voiced implosives *ʔb* and *ʔd* without mention of a voiceless type. A further example of a voiceless nonlabial implosive is to be found in Galla (Andrzejewski 1947), where the only implosive, a retroflex *ʔd*, is reported, like the other voiced consonants, to have a voiceless allophone before a voiceless vowel allophone.

In view of these facts one might at least tentatively accept the thesis that the contrast between injection and ejection need not be accepted as autonomous for general phonetic theory. The implosive is normally voiced,

but voicelessness occurs typically in word final where ordinary 'voiced' obstruents are subject to devoicing. It seems likely, therefore, that the constant feature here is also laxness. Hence one might have a common feature glottalic that is concomitantly injective with the lax feature and ejective with the tense feature.² The relative laxness of the voiced injective stop as compared with the plain is noted several times in the literature (for Dan [Beirth and Zemp 1967, 13] Basa [Bôt Ba Njock 1962, 49] and Wolio [Anceaux 1952, 5]). The voiceless injectives of Kharia are explicitly described as lax by Pinnow (1959, 30).

With regard to sonants, corresponding to the absence of injective/ejective opposition, there is quite surely no phonological contrast of voicing. The recent study of Aoki (1968) sheds important light on this subject. In Klamath there is apparently laryngealized voicing intervocalically while in final position the sonant is voiceless after an initial period of glottal occlusion. Once more, then, phonetically at least, the glottalic sonant is rather more like the injective than the ejective obstruent.

2.3. Preferences regarding point of articulation for glottalic obstruents are summarized in the following formula: injectives tend to have front articulation, ejectives to have back articulation.³ This is shown most strikingly in a number of languages which have both injectives and ejectives. An instance in

point is Hausa, which has two voiced implosives which are bilabial and alveolar and two voiceless ejectives *s'* (or *ts'* depending on dialect) and *k'*. In addition there is a laryngealized or preglottalized *ʔy* which, as will be shown later, is the palatal representative of the implosive series. Thus the injective set has no member in the velar position and the ejective has none in the bilabial.

A gap in the class of ejectives at the bilabial point of articulation is found in a number of world areas. A considerable number of Amerind languages have this characteristic. In North America, probably all the Athabaskan languages (which are, however, also defective in the bilabial series for other sound types), Haida, Tlingit, Tillamook, Tonkawa, Zuni, Western Miwok, and Otomi are among the languages which may be listed here. Far to the south in Bolivia, Itonama, a Macro-Chibchan language has *t'*, *c'*, and *k'* but no *p'*. In Africa, Gwamba, a Bantu language (van Warmelo 1930) has *k'* and various affricates *ts'*, *tl'* etc. but neither *t'* nor *p'*. In Ethiopia, a number of Cushitic and Semitic languages show a similar gap in their series of ejective consonants. An example is Bilin, a Central Cushitic language (Palmer 1958) with the objectives *t'*, *c'*, *k'*, and *kʷ'*. In Amharic and some other Semitic languages in the same area, *p'* occurs only in a few loan words from Ge'ez. In Ge'ez *p'* is likewise of exotic origin as a rendering of Greek *p*. As in other Semitic languages, the Greek unaspirated stops are represented by 'emphatic' consonants.

Korana Hottentot (Beach 1938) has only one ejective in inherited words, the velar affricate *kxʔ*. It also has *ts'* in Nama loan words (once more a sound which does not occur in Nama itself) but no labial ejective.

Some Caucasian languages of the North-east group, namely Avar, Andi, and Lak (Trubetskoy 1926) have an extensive series of glottalic ejectives which once more show a gap at the bilabial position.

Further indication of the favoring of back

² This conclusion is similar to, but not identical with, that of Jakobson (1962, especially p. 655, and 1968). There is agreement that a single checked or glottalic feature is sufficient and that there is no necessity for separate ejective and injective features. On the other hand, the facts cited here in regard to Mayan languages, Iraqw, and especially the Munda languages, suggest that implosives are to be considered checked and lenis, rather than checked and voiced. Cases such as Andi with fortis and lenis voiceless ejectives are then to be analyzed as checked, voiceless, and tense or lax, respectively.

³ This was noted by Haudricourt (1950) insofar as it concerns injectives, and for both series by Wang (1968).

articulation for ejectives is the fact that in Amharic and other Semitic Ethiopian languages, the ejective corresponding to the velar nonejective *k* is the back velar ejective *q'*.

For injectives, on the other hand, the bilabial is clearly the favored point of articulation. Excluding for the moment labial velars which are a special case, it very nearly holds that if a language has one injective obstruent, it is *ʔb*; if it has two they are *ʔb* and *ʔd* (the most common pattern); if there are three they are *ʔb*, *ʔd*, and *ʔj* (the latter a palatal stop, often replaced, however, by *ʔy*); and if four they are *ʔb*, *ʔd*, *ʔj*, and *ʔg*. I know of no language with more than four injective obstruents.⁴

A number of qualifications are to be made regarding the foregoing statements. There are a few languages whose sole injective is *ʔd*. All these are in Africa and the surest examples are from Eastern Cushitic, where it is reported from Galla (Andrezjewski 1957), Baiso (Fleming 1964), and Rendille (Fleming 1964). In Somali there is apparently dialectical and free individual variation between implosive and nonimplosive *d* (Armstrong, L. E. 1934). In Fök, a language of Cameroun, Meyer (1950, 271) describes a single implosive *ʔd* but observes "Ich kann nicht mit Sicherheit sagen dass das *d* . . . implosiv ist . . ." There is, to my knowledge, only a single exception to the generalization that the presence of at least one posterior (compact) injective implies the presence of at least one anterior (diffuse) injective. This is Kinga, a Bantu language (Wolff, R. 1905) which is reported to have as its only implosive a voiced velar *ʔg*.

As will be noted in greater detail in a sub-

sequent section, the expected palatal stop implosive is rather unstable and tends to be replaced by a preglottalized or laryngealized sonant *ʔy*. The velar implosive is a very infrequent sound, and with the exception of Kinga, as noted above, always seems to imply the presence of bilabial, apical, and palatal members of the series. Examples of this pattern are Angas, a Chadic language of Nigeria, Swahili, Masai, Sindhi, and Papago (allophonically before voiceless vowels).

We have yet to consider labiovelars. In individual language descriptions, labiovelarity is often considered as a complex point of articulation. Labiovelars which are confined to Africa and to a restricted region in Melanesia (including part of New Guinea) are in some recent descriptions designated as injectives. For most languages, however, we cannot tell whether we are dealing with injectives or not. Here, once again, the pioneering instrumental phonetic research of Ladefoged (1968) has thrown new light on the subject. His investigations have concentrated on the phonetic variants associated with sounds generally symbolized as *kp*. He distinguishes three types from the phonetic point of view. The first of these, and in his observations the least commonly encountered, involves the superposition of two simultaneous closures on a pulmonic egressive airstream. This can also occur with voicing. There is obviously no basis for considering this sound type to be an injective. In the second type, which is found, for example, in Yoruba and is stated to be the most frequent, an ingressive airstream in the mouth is produced chiefly by retracting the back part of the tongue as in click sounds.

This variety involves a combination of an ingressive velic airstream and an egressive pulmonic airstream in which the velar closure is released first, whence the common symbolization *kp*. It would seem to differ from a bilabial click such as is found in some southern Bushmen languages only in the order of velar and labial releases. In click sounds in general the velar release follows

⁴ The Gutob, Remo, Pareng group of Munda languages for which Pinnow (1959, 44) lists the usual Indian five points of articulation for implosives in his table of phonemes, is probably not a real exception since it is based on phonetically unreliable data, and Pinnow specifically mentions the distinction between dental and retroflex as a point of uncertainty.

that of the closure interior to the velum in consonance with the common symbolizations /g, etc. This variety, then, like the first, does not qualify as an implosive in the ordinary sense, since there is no movement of the larynx and no ingressive glottalic airstream.

The third type, however, which is less frequent than that just described, has some claim to be considered as an injective. It combines velaric and glottalic ingressive air mechanisms. As usual with glottalic implosives, the descending vocal chords vibrate, or at least in this instance in their later phase as indicated by such symbolizations as Abraham's kb for Tiv. Ladefoged considers this third type as a form of kp. Here there is apparently only one type with respect to voicing.

Once again, however, it is not possible to categorize languages on the basis of these types. Thus Ladefoged (1968, 9) in a single utterance in Bini found all three types and in the phonemic inventories of languages the only symbols employed are kp, gb, or for the corresponding nasal consonant ŋm. A single instance, however, was noted in which a contrast between an implosive and a nonimplosive labiovelar was posited; the language is Balese (Vorbichler 1965). For these reasons labiovelars have not been considered here as injectives and the generalizations presented in this paper are to be considered in this light. As will appear later, however, in addition to the phonetic evidence just discussed there is evidence of a diachronic relationship between labiovelars and bilabial injectives.

2.4. A recurrent feature of injectives which deserves special mention and treatment is that the injective corresponding to a noninjective dental is often retracted to the alveolar or alveopalatal position and is consistently apical, often with accompanying retroflexion.⁵ The examples in the sample were so numerous that this property can be considered normal and one may suspect that

it is present in some instances without being noted in the phonetic description. The following are some examples. In Cambodian, t is dental, but ?d is described as post-alveolar, (Henderson 1952) and is represented in the orthography by a symbol of the Devanagari retroflex series. In Lendu, a Central Sudanic language (Tucker 1940) the non-implosive t and d are dental while ?d is alveolar retroflex. With regard to the Moru-Madi languages, also Central Sudanic, Tucker and Bryan (1966, 102) state that "the retroflex tongue position is in fact a more distinguishing feature than the manner of articulation, which hardly seems implosive at all." Armstrong (1934) makes a similar observation in regard to Somali.

This retraction and the frequently accompanying retroflexion often leads in a further stage of development to a preglottalized sonant ?r (e.g. Sara-Mbay) or ?l (e.g. Mamvu). This development is parallel to, but far less frequent than, replacement of a palatal voiced imploded stop by the corresponding laryngealized or preglottalized sonant ?y to be considered in the next section.

2.5. It is a striking parallelism between Africa and Southeast Asia that languages with the characteristic three implosive patterns, bilabial, alveolar, and palatal, have ?y in place of the expected palatal stop. This holds for Sre (also called Koho), a Moi language of the Austroasiatic family, and for Li's reconstructed proto-Tai (1943). In Africa this is particularly common in languages of the Northern branch of West Atlantic (e.g. Konyagi, Pajade). It also occurs in Chadic languages; an example is Hausa with ?b, ?d, and ?y as well as a set of ejectives. This same pattern is found much farther east in certain languages of the Moru-Madi group of Central Sudanic. For example, Logo has exactly the same series of voiced injective consonants as Hausa.

There is a body of evidence that demonstrates that in such cases ?y is indeed the

⁵ This was noted in Haudricourt (1950).

representative of the ejective series at the palatal point of articulation and derives from an earlier injective voiced stop. In Fula, most dialects display the widespread ?b, ?d, ?y pattern, but the extreme western dialects (e.g. that of the Futa Djallon) have a voiced injective palatal stop corresponding to the ?y of other dialects. In the closely related Serer Sin as noted by Pichl (1963) there is similar dialect variation. Here the common pronunciation is that of the stop, but it is noted that in the dialect of Saloum this is sometimes pronounced ?y.

In the system of initial consonantal alternations involving three grades which is common to Fula and a number of other languages of the Northern West Atlantic subgroup of Niger-Congo, the voiced injective consonants of Fula and Serer Sin do not alternate. However, in certain other languages of this group, these sounds participate in the consonant gradation system and may thus provide evidence that ?y is the palatal representative of the voiced injective series.

One example is Bedik (Ferry 1968). In this and in other discussions of the languages of this group, the grades will be numbered as follows: 1. Fricative 2. Stop 3. Prenasalized. These designations are historical and do not always agree with the synchronic data. Following is a relevant portion of the table of initial consonant alternation of Bedik.

1. f	w	?b	s	r	l	š	y	?y	...
2. p	b	b	t	d	?d	č	ǰ	?y	...
3. p	mb	m	t	nd	n	č	nǰ	n	...

From this table it is clear that ?y is both the stop and fricative representative of the palatal series as shown by the occurrence of *n* in series 3. We note that ?b:m = *ǰ:n. It may be noted in passing that here the nonimplosive series involves an alveopalatal affricate where the injective series has a palatal stop or sonant. Indeed, as will be discussed in further detail in the next section, injective affricates do not occur at all, while palatal noninjective stops have a strong

tendency to be replaced by alveopalatal affricates.

Evidence similar to that of Bedik for the status of ?y may also be found in the consonantal alternation system of Pajade and Konyagi in the same group of languages, but it is not considered here. (See Sapir, J. D., forthcoming, and Wilson 1965.)

2.6. We now come to the question of manner preferences of ejective and injective obstruents. It has been seen that stop articulations are common in both sets of sounds. There is a difference, however, in that for injectives the stop is the normal—indeed the nearly exclusive type. As noted by Wang (1968, 8) affricate implosives do not occur. Once again we have to do with what is probably a phonetic impossibility. Preglottalized or implosive voiced spirants do occur but are excessively rare. In the present study only two examples were noted. A bilabial sound described as an implosive β (i.e. bilabial voiced spirant) is reported as occurring in Bongo, a Central Sudanic language (Tucker and Bryan, 62). It is apparently in free variation with the common implosive ?b of this language. Fang-Kwei Li (1965) reports a preglottalized voiced velar spirant ? γ in Sui of Li-Ngam, a Tai language. This sound seems to be the velar representative, absent in the vast majority of instances, of an injective series symbolized ?b, ?d, ?ǰ (i.e. the preglottalized semivowel), and ? γ .

For the ejective, spirants are also relatively infrequent and always imply the presence of some ejectives with abrupt onset (i.e. stop or fricatives). The greatest difference between ejectives and injectives is shown, however, in regard to affricates. They have been seen to be nonexistent for injectives. For ejectives, however, they are quite frequent and stable. In fact, in two languages within the sample all the glottalic consonants are affricate ejectives. These are (Hokan) Chontal (Waterhouse and Morrison 1950) and Korana Hottentot (Beach 1938). Further, for the palatal region in particular, it appears that the optimal ejective is the alveopalatal

affricate \check{c} rather than a stop. This is true also for the plain obstruent, but in the case of the ejective this is even more the case. In the total sample, no example of an ejective palatal stop was found. In this matter, then, ejectives and injectives are in marked contrast.

2.7. Thus far, all the discussion has concerned glottalic consonants taken in isolation. We now consider certain properties of these sounds in regard to sound sequences and to syllabic position. In general it may be noted that both ejectives and injectives, particularly the latter, tend to be more limited in their combinational possibilities than plain consonants. Syllabic initial position is favored for glottalic consonants in general. In almost every language studied they occur in syllable initial position, while in many they do not occur in syllable final even when the corresponding plain consonants do. However, most Munda languages are a striking exception to this generalization since injectives occur ONLY in word or syllable final where they are always unvoiced lenis.

Similarly, injectives are found in word initial as against word medial intervocalic position. Examples are the following: In Kpelle (Welmers 1962, 77) δ "occurs intervocalically, but not commonly and, in that position, is frequently $[\delta]$, a bilabial resonant without the lip-rounding characteristic of w ." Zulu $ʔb$ is stated to be a kind of fricative between vowels (Panconcelli-Calzia 1923, 290). In Gurma, a Voltaic language, in which there is no distinctive opposition between $ʔb$ and b , it is noted that $ʔb$ occurs in word initial while implosion is nonexistent or at least less strong in intervocalic position (Chantoux, Gontier, and Prost 1968, 16). A similar relation is found in Sara-Mbay (Tubiana 1962, 336) between the preglottalized $ʔr$ which is the apical representative of the injective series and a flapped r , the former occurring word initially, the latter intervocalically.

In general glottalic consonants are far less free in their clustering than plain consonants.

Not a single example of a cluster containing both an injective and an ejective was found in the present material, for obvious phonetic reasons. Injectives tend not to cluster with plain consonants. The only instances of tautosyllabic combinations involving obstruents noted were in Mon (Luce 1965) where such syllable initial combinations as $k\delta$ and $t\delta$ occurred, and in Khmer (Henderson 1952).⁶ These conform to what might be called the 'law of the voiced syllabic center' (Greenberg 1965); namely, that voicing, at least for obstruents, is not interrupted by an unvoiced segment and then voiced again within the domain of the same syllable. In Tsotsil, a Mayan language, the phoneme $ʔb$ has a non-imploded allophone when preceded by a stop (Weathers 1947, 108). In Aguacatec, another Mayan language (McArthur 1956), the phoneme $ʔb$ has a plain voiced b as a final member of a consonant cluster.

The most conspicuous single fact, however, about combinations with injectives is that, in contrast with the highly favored status of nasal followed by homorganic plain voiced stop, there is an avoidance of corresponding sequences with injective voiced stops, i.e. combinations of the type $mʔb$, etc.

With one probable exception, to be noted later, all occurrences of the sequences of this type involve an intervening syllable boundary. The following typical phenomena recur in all major world areas in which injectives are found. In some languages the normal variant of voiced stops are injective; and noninjective allophones occur only after the homorganic nasal. Examples include Mazahau, an Otomi language, Jeh, Katu, Mnong, and Sre in Southeast Asia, Sindhi in India, and numerous examples in Africa including widely scattered Niger-Congo languages (e.g. Fula, Swahili, Konde, Kpelle, Mondunga) and Nilo-Saharan languages (Moru, Ngambay-Mundu, Masai). In Bantu lan-

⁶ However in Shorto's dictionary of Mon (1962) these clusters do not occur and the corresponding forms have a vowel ϵ between the initial non-injective and the injective consonant.

guages one finds alternations such as Konde ulu-6afu/imbafu *rib/ribs*.

In those languages of the West Atlantic and Mande branches of Niger-Congo which have initial consonant mutation, in all those cases where the system would lead us to expect *^m?b etc., it is never found. In its place we may find mb (Biafada, Konyagi), ?b (Fula, Serer Sin) or m (Kpelle, Basari). The only exception noted to the nonoccurrence of tautosyllabic nasal and homorganic voiced implosive is, apparently, Vai (Von Essen 1935-6) which has syllable initial ^m?b but no ^mb. In Sedang nonimplosive voiced stops occur only in prenasalized form and "Voiced stops lose their nasalization when preglottalized" (Smith 1968, 55).

In contrast, the unvoiced ejective occurs freely after a homorganic nasal and in some languages replaces an expected plain unvoiced stop or affricate in that position. In Zulu, which like so many other languages has a voiced stop ?b which is injective except in the tautosyllabic sequence mb, the unvoiced stops and affricates are aspirated except when prenasalized, in which case they are affricated ejectives. Thus for the bilabials we have ?b:^mb = p':mpϕ'. A strikingly similar situation is found in Mazahua (Spotts 1953). Two voiced stops, b and d, are injective except when preceded by a nasal consonant which is always homorganic. The ejectives t', k', ts', tš', k'', and s' (note the typical gap in the bilabial position) are analyzed as sequences t' etc., and these sequences occur after the homorganic nasal consonant.

Finally, it may be noted that whereas injectives preceded by a nasal sequence are highly disfavored, the injective may have a nasal release producing a unitary complex sound in which the nasal is generally described as not forming a separate syllable. There are well-attested examples of this in Mayan languages. In Pocomchi (Meyers 1960) the injective ?b has ?bm, ?p, and ?p^m in free variation before terminal junctures. Aguacatec (McArthur 1956) has similar voiceless variants in free variation with

p^m, i.e. p with a voiceless nasal release. This is evidently the source of Tsotsil ?m as the allophone of ?b in syllable final when not utterance final and ?M in utterance final.

2.8. There is evidence from areas as distant as New Guinea, Southeast Asia, and distinct areas of Africa that consonants affect the pitch of adjacent vowels, particularly those which immediately follow. The most important principle is that plain voiced or breathy voiced consonants, particularly obstruents, lower the pitch of the entire vowel segment or that portion which is immediately adjacent so that, for example, a following high tone becomes a rising tone.

On the other hand, a voiceless plain or aspirated segment has no such lowering effect. An ejective likewise fails to lower pitch. A voiced injective stop here has an effect identical with or more similar to that of voiceless and ejective consonants than to ordinary breathy or voiced consonants, i.e. it does not lower tone. All of these non-lowering sound types may even on occasion raise pitch.

The clearest evidence concerning this comes from languages in which tone variation is still allophonic so that neither internal reconstruction nor an application of the comparative method is necessary to establish the conditioning factors. There are several examples in Africa of languages in which tones have lowered allophones depending on the preceding consonant. One is Bassa (Hobley 1964), a Kru language of Liberia in which the consonants are divided into two mutually exclusive sets. After the first set, which may be called the lowering set, a following high tone becomes a low-high glide, a following mid-tone becomes a low-mid glide, and a following low tone is unaffected. After the second set, high and mid tones are unaffected but a following low tone is replaced by a mid-low falling tone. There is also a high-low glide which is apparently unaffected by the preceding consonant. Unfortunately Hobley's account is unaccompanied either by a chart or a phonetic description. The lowering set

consists of the following consonants: b, d, g, gb, gm, h, hw, j, v, z; the raising set of: č, f, k, kp, s, t, xw, ɸ, d, dy, m, n, ny, w. Most germane to the present purpose is that ɸ, apparently the only implosive, patterns with the unvoiced obstruents and the sonants in that it raises tone. It may be conjectured, on the basis of other cases, that h and hw have breathy voice (i.e. are 'voiced'). The symbol gm is probably intended to represent a nasal labiovelar. The retroflex d is tone-raising rather than tone-lowering and contrasts in point of articulation with the dental or alveolar t and d. Among the group raising tone is likewise dy, which is a palatal stop and thus differs from the alveopalatal affricates č and j. These illustrate the points made in 2.4 and 2.5 respectively. Such considerations suggest strongly that d and dy are former implosives. We started with the typical three implosive pattern ?b, ?d, and ?j; the implosion has been retained only in the most anterior implosive ?b in accordance with the observation of 2.3 regarding point of articulation preferences among implosives.

Important evidence regarding the effect of consonants on tone is also forthcoming from the closely related Nguni Bantu languages of South Africa, Zulu and Xhosa. Here, as first pointed out by Beach for Xhosa, voiced h and the breathy voiced obstruents and sonants lower pitch, whereas the voiceless aspirated obstruents, the simple implosive ?b, and the non-breathy voiced sonants do not lower pitch. A single plain voiced obstruent, g (i.e. without breathy voice) likewise lowers pitch and therefore presumably formerly had breathy voice.

There are a considerable number of examples from Southeast Asia of languages in which tonal modifications of vowels can be shown, on internal and/or comparative grounds, to have arisen from adjacent consonants. In some instances injectives are involved and it can be shown that they do not exercise the tone-lowering effects of the voiced plain consonants. Sometimes they act

partially like voiced and partially like unvoiced, though more like the latter. Haudricourt in a fundamental study (1961) describes a considerable number of instances in Southeast Asia of tone modification based on the manner type of the preceding consonants. These involve languages in all major families of the area: Thai-Kadai, Austronesian, Miao-Yao, Sino-Tibetan, and Austroasiatic. In most instances, as in Africa, consonants may be divided into two sets, those which exercise a tone-lowering effect and those that maintain or raise tone. Fairly frequently there is a third intermediate set which behaves predominantly like the second, but sometimes like the first. There has frequently been consonant merger after tonal differentiation so that the earlier situation has to be reconstructed by comparative evidence and internal reconstruction, sometimes abetted by analysis of the orthographic system which may reflect an earlier state of affairs (e.g. Siamese, Cambodian, Mon). From these data in Haudricourt and from other sources it is possible to construct a hierarchy of consonant types which may be symbolized in the following manner using symbols for alveolar consonants as type indicators: th, ?n, hn \geq t, \geq ?d > d, n. The symbol sequence hn indicates voiceless sonants. By $X > Y$ is meant that X always exercises a smaller tone-lowering effect, and by $X \geq Y$ that X never exercises a greater tone-lowering effect than Y. Since none of these languages has voiceless ejectives it is not possible to place these sounds within the hierarchy by Southeast Asian evidence.

It will be noted that voiced injective stops, as in Africa, are always less productive of tone lowering than the corresponding plain voiced stops. The glottal stop always seems to have the same tonal effects as the voiced injective stops (Li 1943).

2.9. Finally it may be observed that the hierarchical relation between the normally voiced injective stops and the corresponding plain voiced stops is not parallel to that between the voiceless ejective and voiceless

plain stops. The latter is a classic instance of a marked/unmarked relationship in that unvoiced ejectives never exist without plain stops. Indeed, the latter type is found, to present knowledge, in all languages. On the other hand, there are instances in which the entire voiced series is imploded to the exclusion of the plain voiced type. Examples are Maidu, Mazahua, Lotuxo, and Teso. Rather more numerous are the instances, like Masai and Swahili, in which the 'normal' allophone of the voiced stop series is implosive, while the nonimplosive occurs only when preceded by a homorganic nasal consonant. However, as Ladefoged (1967, 1968) emphasized, laryngeal phonation types form a continuous series in which the boundary between implosive and plain voiced stop is to some extent arbitrary. As pointed out by Fischer-Jørgensen (1963, 33) it has been observed in French, not normally regarded as having voiced implosive stops, that there is a lowering of the larynx in the production of these sounds. The difference between these sounds and true implosives would rest on a difference in the speed and vigor of the larynx lowering that is involved.

For sonants, of course, the picture is quite different. Here the voiced is clearly the unmarked type in relation either to the laryngealized types which function as representatives of both injective and ejective obstruents or to the voiceless type.

Sometimes, as has been seen for example in Hausa and in many Mayan languages, there is a single glottalic series, injective for front consonants and ejective for back. Contrasts between injective and ejective series is rare but does occur, e.g. Montol (Jungrathmayr 1965) and Maidu.

3.1. On the basis of the essentially static considerations concerning the properties of glottalic consonants developed in 2. we now seek to depict the course of events by which these consonants originate and undergo characteristic developments which often result in loss of the glottalic feature. The treatment

of this topic is of a merely preliminary nature. It is basically limited to the injectives, with some attention also to laryngealized sonants. Ideally, all languages with these sounds should be subject to the application of the diachronic methods of internal reconstruction, comparative study, and direct historical evidence, where this is available. This is far more than can be attempted here. Moreover, in many cases, essential data are lacking.

From the conclusions of 2.9 regarding the lack of marked/unmarked relation between plain and injective voiced stops, it is possible to derive the general diachronic hypothesis that at least one source of injectives might be a sound shift from voiced plain to voiced implosive stops, since such a change would result in a system of an attested type, namely one in which there were injective but not plain voiced stops. There is at least one historically documented example of this development, namely Sindhi (Bailey 1922 and Turner, R. L., 1924), in which an injective series derives from earlier plain voiced stops. It was noted earlier that the maximum number of injective stops found is four, that the dental or alveolar member tends to be retracted and/or retroflex, and that the palatal member never becomes an affricate. All this occurs in Sindhi, so that the injective series exhibits what might be called phonetic optimality in striking disregard of the remainder of the noncontinuant system, which shows the typical Indic pattern of five positions of articulation with an alveopalatal affricate rather than a palatal stop. This pattern is shown in the usual four series consisting of unvoiced non-aspirates, unvoiced aspirates, voiced nonaspirates, and breathy voiced (i.e. 'voiced aspirate') consonants (Bordie 1958).

In other instances such a development can be inferred from comparative or internal evidence. Given the factors discussed in 2.3 concerning the hierarchy of preferences for forward points of articulation and that of 2.7 concerning the disfavoring of combina-

tions of nasal and injective, we may derive the following further hypotheses. Sometimes only forward members of the voiced plain series will become injectives while back members will remain or undergo other developments. If nasal and voiced plain stop combinations existed these might be expected to survive the shift of plain voiced stops to injectives so that the change would become conditioned. Both these hypotheses are verified in a number of Bantu languages. For example, in the central and eastern dialects of Shona (Doke 1931), *b* and *d* have become ?*b* and ?*d*, except in the combinations *mb* and *nd*, while *j* and *g* have not undergone a change to injectives. In Vietnamese *b* and *d* have become injectives while *g* did not undergo this development.

Moreover, it is not necessary that the shift to voiced injectives take place simultaneously in all positions. If there is an order in which this takes place it can be expected to reflect the characteristic hierarchy of points of articulation already discussed. We may further postulate a reverse hierarchy of dissolution by which the least favored positions will undergo loss of the glottalic feature first. This is not unlike the well-known Jakobsonian hierarchy of acquisition in child language and loss in aphasia (Jakobson 1941). It may not always be possible to determine whether we are dealing with the formation of a new system or the dissolution of an old one. A few examples from the material examined in the present study will now be considered from this point of view.

A probable instance of an incipient development of an implosive and, as expected, at the bilabial point of articulation, is found in the Kalenjin languages of East Africa, forming the main body of South Nilotic languages. There are two divisions of Kalenjin: Päkot (also called Suk) and Nandi-Kipsigis. In the latter, "p is pronounced very softly, alternating initially with *b* (and occasionally with *ɓ*) with some speakers" (Tucker 1964a, 199). It will be noted that this takes place in initial position which, as has been seen in

2.7, is the favored position for injectives. Tucker, (1960) has made a similar observation for Konza, a Bantu language of East Africa, regarding what appears to be an incipient pronunciation of *b* as an implosive.

In Kirma (also called Gouin), a language of the Voltaic subgroup of Niger-Congo, "*b* initiale est prononcé parfois avec préglottalisation . . ." (Prost 1964, 21). Here again it is the initial position which is favored. In both instances the comparative evidence shows that the injective pronunciation is an innovation.

In several languages with two injectives, ?*b* and ?*d*, the former shows greater stability. None of these, however, appears to be an instance in which implosion has started with *b* and spread to *d*. In Alur, a Western Nilotic language, both injective and non-injective *b* and *d* exist, as well as *kp* and *gb*, both described as injectives. Whereas *ɓ* is stable, "*d* is often interchanged with alveolar *d*" (Knappert 1963). This seems to be an established system in which ?*d* is tending to merge with *d*. A similar situation appears to exist in the Wanning dialect of Hainan where ?*b* is stable but there is free variation between *d* and ?*d* (Egerod 1967 referring to a paper by Chan). On the other hand, the only contrary evidence noted to the tendency for the greater stability of ?*b* and ?*d* is likewise from Hainan where it is reported for the Haik'ou dialect that for the younger generation the tendency is *ɓ* > *p* while *d* appears to be stable (ibid., reporting on a paper by Liao).

When, in accordance with 2.4, the injective in the dental or alveolar position has become retracted and/or retroflex, there is a tendency for its glottalic feature to be lost since it has become redundant. According to Tucker (1940, 102) in the Moru-Madi the retroflex tongue position is more important than the implosion, which may be lost.

The Sara group, which is, like Moru-Madi, part of the Central Sudanic subfamily, shows various stages of the loss of implosion in the former **d* which from retroflexion has usually gone on to ?*r*. For Mbay, Fortier (1967)

states explicitly: "Le mbai a la différence du ngambai . . . ne possède qu'une injective: /d/ a disparu." The remaining injective is, of course, ɓ. According to Vandame (1963) Ngambay does have two implosives but they are in the process of losing their implosion, ɓ merging with the previous b and d' with previous r. It is noted that the youngest generation prefers b and r. In the form of Sara described by Haldaire and Robinne (1955-59, 13) the oldest generation usually has ?r with r as a less frequent variant, while children most frequently have r. In regard to Mbay, the favoring of initial position for injective pronunciations is also evident. For those speakers who have not replaced all cases of former ?r with r, ?r is initial while a flapped r occurs in medial position (Tubiana 1962).

A further example of the greater stability of the bilabial as compared with the dental-alveolar injective is furnished by Bedik, a West Atlantic language (Ferry 1968). In the system of initial consonant alternations, the continuant grade of ?ɓ has remained as ɓ while ?d has become l.

The tendency of the palatal injective to become a laryngealized ?y was discussed in 2.5. The positional hierarchy is further exemplified by the fact that none of the languages considered had shifted *d' to ?r while still retaining the palatal injective as a stop. Thus there are no systems of the type ɓ, ?r, ?j, while systems of the type ɓ, d', 'y are common.

The morphophonemics of Katu (Costello 1966) gives strong evidence of the former existence of a three-term system in which ɓ and d' still exist, but ?j has lost its glottalic feature: *sec to sleep*; *banec bed* = *d'ah to eat meat*; *danah meat for eating* = *d'yiik to clear ground*; *janiik cleared ground*. Here the former injective has retained its stop articulation whereas the plain stop has, as so often, become an alveopalatal affricate.

In 28 it was pointed out that in Bassa ɓ, d, and y all had the same tone-raising

effect at the unvoiced consonants. It is possible therefore to infer that d' < *d̥ and y < ?j, with ɓ once more showing the greatest persistence.

The instability and relatively rare occurrence of the velar injective, which is least favored, is so great that it is difficult to discover its usual course of development. A number of instances have already been cited in which the other voiced stops became implosive while g remained. In most instances, however, we have a gap in the velar position for the injectives, in contrast to a plain voiced series without such a gap. There is evidence from Semang-Sakai (Pinnow 1959, 66) that *?g has become ?. In Kharia, a Munda language, the lenis unvoiced injectives ?b, ?d, ?j, which occur only in word or syllable final, alternate with the unvoiced aspirate p', t' č' before the suffix o' of the past (Biligiri, 54). In the same environment the injective corresponding to k' is ?, showing that the latter originated from *?g. It may be suspected that when ?g does arise as part of a complete series, in many instances it becomes ? and then zero. Sui, which has ?y along with ?b, ?d, and ?y (as well as w? and laryngealized nasals) may give evidence of a transitional stage between ?g and ?.

Thus far only one source of voiced injectives has been considered, namely acquisition of the glottalic feature by a previous plain voiced stop. There are, however, at least two other processes by which languages may come to have voiced injectives. One of these relates to ɓ only. There is evidence that ɓ can arise from a previous gb (presumably implosive) by loss of the velar closure. This possibility is illustrated by some of the Southwestern Mande languages and can be deduced once more from initial consonant alternatives. In Loma (Sadler 1958) there is a two-grade system and there are a number of clear instances in which unvoiced/voiced is the principle of distinction. The voiced equivalent of kp, however, is not *gb, as

would be expected, but 6. In Loko, also a Southwestern Mande language, with initial consonants *kp:gb* alternation exists parallel with *p:b* and *k:g*. Innes (1964, 116) noted, however, that one informant who worked with Meeusen had a voiced implosive in place of *gb*. The common Ibo pronunciation as a velarized labial is quite possibly a transitional stage between *gb* and *ʔb*. Some Ibo dialects, as noted by Ward (1936, 6) and by R. G. Armstrong (1967) for Ukwaali, have velar occlusion which may represent the earlier stage within Ibo. Evidence for the other common source of injective stops is from a cluster consisting of a voiced plain consonant and a glottal stop. The evidence in this case comes from the group of Austro-nesian languages spoken in Vietnam containing Cham, Rade, Jarai, and Chru. These languages have generally reduced the typical Austroasian canonical form CVCVC to the monosyllabic regional norm by reduction or loss of the first vowel. When the second consonant is the Austronesian laryngeal *ʔ* and the first is a voiced stop, the result is a voiced injective.⁷ For example, the reflexes of PMP **buʔuk* *hair* include Rade *ʔbuk*, Jarai *ʔbuʔ*, *ʔbuk*, and Chru *ʔbuʔ* (Thomas 1964). Less frequently, if the laryngeal is the first consonant the same result ensues. Thus from PMP *ʔijuN* *nose*, Thomas gives Jarai, Chru *ʔadun*, Rade *ʔdun* or *ʔadun*. An unusual case for which no parallel can be cited is Pākot, a language with an already established *ʔd* in which, according to Tucker (1964b, 446) "The implosive is also found occasionally as the nasal of the combination *|y| + |t|*."

A final possible source of injectives is found in Papago (Saxton 1963) where the plain voiced stops have preglottalized allophones or voiceless consonants. There is a possible parallel in the instance cited by Wenck (1954, 176) of the Japanese dialect of Southern Kyūshū in which after the loss of final *i* and *u* presumably after a

stage of voicelessness, preceding stops have become implosives.

In regard to further changes of injectives once they have been established, again there are other possibilities beside loss of the glottalic feature. The supraglottal articulation may be lost so that only a glottal stop remains. Westermann and Ward (1933, 96) note regarding Bari, an Eastern Nilotic language, that "with certain speakers the mouth articulation of *b* and *d* is often omitted and the glottal articulation alone remains." Pichl (1966, 4) observed a similar tendency in regard to Serer, one of the Cangin languages of the West Atlantic subgroup of Niger-Congo, in which *ʔ* often replaces *d*. In Margi (Hoffman 1963), *ʔ* may replace 6 before *u*. A related phenomenon is reported by Klingenberg (1963, 8) in the Fula of Adamawa where *ʔy* may replace 6 and *d* before front vowels. Here both the palatal glide and glottal occlusion remain.

In earlier discussion of Mayan languages it was noted that the bilabial ejective might have a nasal offglide in final position. In some instances this has developed into a laryngealized *m*. In Chalchihuitacàn Tzotzil (Hopkins 1967), /6/ has *ʔm* as a pre-junctural allophone and *m* before consonants.

In Jarai (Haudricourt 1950), *ʔm* corresponds to and has arisen from *ʔb* found in other languages of the Vietnamese Austronesian subgroup, and similarly *ʔñ* may correspond to *ʔj*. Similar developments have been noted in Thai languages with subsequent loss of glottalization. Thus the dialect of Po-ai (Li 1959) has *m*, *n*, and *y* as reflexes of the proto-Thai injective series, and certain Burmese Shan dialects have *m* and *l* as reflexes of 6 and *d* (Li 1943). In Vietnamese *m* and *n* have as one source earlier 6 and *d*. Thus Ferguson's query regarding the source of new nasals receives an answer, although from a worldwide perspective this is hardly a major one (Ferguson 1966).

3.2. The double status of laryngealizedsonants as corresponding to both injective and ejective sonants was noted at the very be-

⁷ Dyen's **q* and **h* give *h* and *ʔ*, respectively, in these languages. I have, therefore, modified his reconstructions accordingly (Dyen 1953).

ginning of the discussion. We have just seen that laryngealized nasals may replace corresponding voiced injectives. Laryngealized nasals may also develop from the corresponding non-nasal voiced injective stops when preceding nasal vowels. According to Samarin (personal communication) the ?m and ?n of Gbeya which he formerly considered independent phonemes are allophones of ?b and ?d before nasalized vowels. Morphophonemic alternation in Margi (Hoffmann 1965) shows that laryngealized y and w may arise from the sequence glottal stop + non-syllabic i and u respectively.

When an ejective series exists, as Aoki (1968) shows for Nez Perce, laryngealized sonants may morphophonemically replace the sequence sonant + ? in a manner parallel to that by which unvoiced stop + ? produces an ejective unvoiced stop.

4.1. The considerations adduced in Sections 2-4 obviously bear on the problems of comparative reconstruction. When for any class of sounds we can develop an overall theory concerning their patterning, phonetic characteristics, and dynamic tendencies, we will have made a contribution toward more accurate, realistic, and phonetically detailed reconstruction. For present purposes we will consider only one example in which such an approach helps to resolve an existing problem.

The case is that of Cham, an Austronesian language of Vietnam. This language, like the closely related Jarai, Rade, and Chru mentioned earlier, has tended toward loss or reduction of the vowel of the first syllable, thus producing extensive monosyllabism. Unlike the other languages of this group, however, Cham has also followed another regional tendency, lowering of pitch after originally voiced obstruents. The ensuing shift of voiced sounds to voiceless merging with previous voiceless sounds has caused a hitherto atonal language to generate a tonal system of two levels, rather than to

double the number of tones as in other languages of Southeast Asia.

This development, along with others, is treated in Blood (1962). Thus PMP *beli? to buy > Cham plèy with low tone, but PMP *puluh ten > Chan plùh with high tone. However, Blood's material gives three exceptions in which PMP *b is not reflected in p followed by low tone but in b followed by high tone. Judging from the observations of the present study, we suspect that in these cases b has developed from a voiced injective. This is both because *?b would not be expected to have the same tone-lowering effects as *b and because ?b, as has been seen, often changes to b but, as far as can be seen, never to p, at least directly. Hence a sequence of shifts *b > p followed by *?b > b may be posited, with low-pitch allophones on the following vowel only in the first case. Of the three Cham words in question, given by Blood as buq (i.e. bu?) hair, bew odor, and bla^q (bla?) to open the eyes, the first two have Dyen's h which, as has been seen, acts like ? to which it had apparently shifted, in languages of this group. Hence we may posit, parallel to developments in other languages of the Vietnamese Austronesian group, the following sequence of changes: PMP (or better, pre-Vietnamese Austronesian) *bu?uk hair > ?buk, and *ba?u? odor > ?bew.

It may be presumed that Blood's material is phonetically accurate. Cham orthography, based on an Indian source, gives decisive evidence that the interpretation in the preceding paragraph is correct. The dictionary of Aymonier and Cabaton (1906) presumably gives a modified transcription of the orthography rather than the actual phonetics of that period. Here, as in other orthographies of the region, the letters of the Sanskrit unaspirated voiced series are used where the present language has an unvoiced consonant followed by a low-pitched vowel and, correspondingly, the voiced aspirate letters where an unvoiced aspirate is followed by a

low tone. The following examples show that in Cham, as in other languages of the same group, *h (i.e. Dyen's q) gives rise to aspirated consonants just as *ʔ (Dyen's h) produces injectives. Aymonier and Cabaton's transcriptions follow Cham orthography. However, besides b and d, two additional symbols in Cham orthography resemble these in form. Aymonier and Cabaton transcribe these as ɸ and ɖ and describe them as ɸ and ɖ 'douce'. The first of these occurs in all three words which show the irregular correspondence in Blood. The following table includes these three as well as a few other examples to show the correspondence among PMP, Cham orthography, and Blood's transcription.

	A AND C. BLOOD		*PMP
branch	dhan	thàn	d/Dahan cf. Rade dhon
four	pak	páʔ	*(em)pat
moon	bulan	pelàn	*bulan
hair	ɸak, ɸuk	búʔ	*buʔuk
odor	ɸau	béw	*baʔuʔ
open the (eyes)	ɸlak	bláʔ	*bulat

5.1. It was originally intended to discuss fully the phonetic factors underlying the phonological conclusions of this paper.⁸ However, after further consideration, it seems more advisable to limit considerably this aspect of the discussion. It is probably more constructive to leave such matters to those whose professional specialization is in instrumental phonetics and the physiology of speech. It is to be hoped that the conclusions of the present paper, based as they are almost entirely on the field observations of phonetically trained linguists rather than on the product of laboratory investigation, may stimulate a search for phonetic explanations. For the most part, what might be offered

here is either so obvious as not to require mention, or so problematical that it should not be mentioned. Nevertheless, observations on a few points may be offered.

Haudricourt (1950) already conjectured that two of the phenomena noted here, the tendency towards retroflexion and retraction in apical injectives and the tendency towards replacement by nasal consonants, could both be attributed to the rarefaction of the air in the supraglottal cavity caused by the descending larynx. The relative vacuum thus produced would tend to suck in the mobile tongue tip and the velic. This explanation is somewhat strengthened by the existence of the phenomenon, not known to Haudricourt, of nasal off-glide of injectives, which is a possible transitional stage in the change to a nasal consonant. The velic would tend to be lowered somewhat late as the descending glottis increased the rarefaction. However, whether the pressure difference is really great enough to cause these phenomena still remains to be investigated.

The point of articulation hierarchies of ejectives and injectives are obviously based on preference for a small and large air chamber, respectively. It is also clear that with the same thoracic pressure it is easier to build up compression in a smaller chamber. Injectives are usually voiced and involve leakage of air through the descending chords; such leakage is more easily tolerated from a larger chamber.

5.2. Certain aspects of the present paper which have a bearing on broader theoretical problems and which have remained implicit or have received only passing notice in the body of this paper may be briefly considered here.

The example of the four Sindhi injectives was discussed in 3.1 as a striking instance in which phonetic optimality triumphs over what might be thought an irresistible systemic pull of four separate series of injectives, all at the same five points of articulation. Not only is there a gap among the

⁸ I have benefited greatly from discussion of these questions with William S.-Y. Wang, and some of the following observations were suggested in discussion with him.

Sindhi injectives, but their phonetic realizations differ in several instances. The Sindhi injectives are thus far more easily comparable to those of other languages such as Angas, with four implosives embedded in a very different consonantal system, than to the remainder of the Sindhi system.

Although such clear instances are, indeed, rather rare and, in general, a considerable amount of symmetry reigns in phonological systems, it should be pointed out that where symmetry obtains it is basically a byproduct of diachronic processes by which the feature rather than the individual phoneme is the unit of change. Where it is cross-cut by a powerful graded hierarchy such as that of the positional preferences of implosives, the result is often asymmetrical. Thus in many languages only ?b and ?d exist as injectives, or only ?b, while other series are more extensive. Symmetry and asymmetry are therefore, it may be submitted, most easily understood as resultants of diachronic forces.

In general this paper is intended to illustrate a methodology in which synchronic systems, and diachronic generalizations regarding change, are mutually supportive, and in which historical comparison and reconstruction enter in an integral way. In developing such a synchronic-diachronic account, historical linguistics makes a central contribution to the overall picture. The view set forth here thus differs in regard to the relation between these two fundamental branches of linguistics from what has been prevalent since the rise of structuralism. In all these developments the center of theoretical interest has been synchronic, and each synchronic theory in its heyday has sought to restructure or to reinterpret diachrony in its own terms. While real contributions have thus been made, it might be contended that they were merely peripheral to the basic enterprises of diachronic linguistics which, in its general aspect, seeks regularities regarding processes of change, and in its particularistic studies of individual language change has its own principles of historical

explanation which are not coincident with or exhausted by synchronic analysis.

Finally, it may be pointed out that in the present investigation the notion of point of articulation was indispensable for the statement of generalizations. Yet in current theories this concept has been rather obscured. Further, the hierarchy of positions of articulation which is correlated with the size of the air chamber is most naturally expressed by an ordering, and such orderings, where more than two values on a dimension are involved, require an additional logical principle not deducible from unordered sets of binary oppositions. This same problem is involved in the analysis of pitch levels in tonal languages, which may require an ordering of as many as five levels.

The tentative nature of the present study should be obvious. In general it would seem that numerous and more complete studies of individual aspects of phonology should be carried out, independent of an excessively rigid framework of features. Only then will we be in a position to construct an overall system for the phonology of the world's languages.

BIBLIOGRAPHY

ABBREVIATIONS

- | | |
|-------|---|
| AL | Anthropological Linguistics |
| ALS | African Language Studies |
| AuU | Afrika und Uebersee |
| BEFEO | Bulletin de l'École Française du l'Extrême-Orient |
| BSLP | Bulletin de la Société Linguistique de Paris |
| BSOAS | Bulletin of the School of Oriental and African Studies, London University |
| JAL | Journal of African Languages |
| JSA | Journal de la Société des Africanistes |
| JWAL | Journal of West African Languages |
| Lg | Language |
| LP | Lingua Posnaniensis |
| SIL | Studies in Linguistics |
| ZPSK | Zeitschrift fuer Phonetik, Sprachwissenschaft und Kommunikationsforschung |
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INDIGENOUS PIDGINS AND KOINÉS

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AMERICAN BIBLE SOCIETY

0. Misconceptions about pidgin vis-à-vis creole, trade language, lingua franca, koiné
1. Kituba, an indigenous pidgin language of Congo
2. Police Motu, an indigenous pidgin of Papua
3. Significance of pidginization in the light of information theory
4. Procedures in the development of pidgin languages
5. Koiné forms of language
6. Summary of degrees of response to situations of language contact

0. There are a number of popular, but erroneous, ideas about pidgin languages. One particularly widespread view is that pidgins are only very much simplified forms of standard languages, with self-evident concessions to the ignorance or linguistic peculiarities of so-called 'natives'. Moreover, it is assumed that within a few minutes any speaker of the dominant language can adjust his speech so as to talk pidgin, or at least so as to understand it. In addition, it is assumed that pidgins really have little or no stable structure; that is to say, each speaker merely improvises as he goes along. Nothing could be further from the truth. Pidgin languages are not merely simplified world languages, and one simply cannot throw words together in any form or order and expect local people to understand. In fact, learning to speak a pidgin language well can be as difficult as mastering any foreign language, except for the fact that many of the lexical forms are at least familiar, but deceptively so, since the meanings assigned to them in the pidgin language are so often radically altered.

Some people regard any so-called hybrid language as being a pidgin, long after such a

language has become the only language of a relatively large speech community. In early colonial days the form of French spoken in Haiti by the slave population from Africa and the European plantation managers was obviously only a pidgin, but rapidly this form of speech became the only language for the largely Negro population. In this process it evolved from a pidgin into a creole, with all the structural elaboration and vocabulary enrichment which is involved in any full-scale language.

Another misconception about pidgins is that they consist merely of the vocabulary of one language and the grammar of another. The dominant language, normally foreign to the area, is supposed to provide the vocabulary, while the local language or languages provide the grammar. Another view of pidgins is that they are merely a kind of local *mélange*, in which the ingredients from various languages are so mixed up that one cannot determine any genetic relationship. But a careful study of pidgins has indicated that both these views about pidgins are unjustified.¹ It is true that certain important structural features of the dominant language are altered by the speakers of local languages, but the essential structure of the dominant language remains.

Many people have thought that all pidgin languages were the result of contact between (1) some great 'world language', such as English, French, Portuguese, or Spanish, and (2) the local languages. Most of the pidgins which have developed within the last few centuries have involved such combinations, e.g. Taki-taki, Papiamentu, Wescos, Neomelanesian, and Chinese-English Pidgin, but this is certainly not a universal feature of pidgins, even as we shall be point-

¹ See Hall (1966).

ing out later in this paper, in referring to Kituba, spoken in the Congo, and to Police Motu, spoken in Papua.

The assumption that any 'trade language' is a kind of pidgin, is also quite incorrect, for a number of trade languages are simply dialectal extensions of a regional language. In classical times the Greek language spread throughout most of the countries bordering on the eastern portion of the Mediterranean. Attic Greek became somewhat changed in this process of becoming a trade language, but at no time was there a Greek pidgin, a form of language which was structurally distinct from and mutually unintelligible with Greek as spoken by Greeks themselves. Koiné Greek did undergo typical modifications in the direction of simplification of morphological and syntactic structures, but when any language extends over wide areas as a commercially important tongue for bilinguals, such structural simplifications are common. These types of linguistic modifications must, however, be carefully distinguished from typical pidgin developments.

Though a number of important studies have been made of pidgins and creoles,² there are two phases of such studies which have not been adequately dealt with. First, insufficient attention has been paid to the fact that pidgin languages do arise in so-called indigenous situations, that is, in circumstances in which there is no world language present and therefore in which the pidginization is not the result of contact between colonizers and 'natives'. Second, the distinction between pidgins and Koiné languages has not been sufficiently recognized. Any trade language tends to be regarded as a *lingua franca*, and *lingua franca* is equated with pidgin. Such an identification leads to quite erroneous conclusions about the nature of the linguistic structures of

such koiné forms of language. The present paper is an attempt to correct these two gaps in the record.

1. Kituba³ (also commonly known as *Kikongo ya Leta*) is spoken by some 1,500,000 persons in the Lower Congo and in the Kwango-Kwilu region of Congo-Kinshasa, and in southwestern Congo-Brazzaville. It arose toward the early part of the 16th century in the Lower Congo as a means of communication between various Bakongo tribes engaged in slave and ivory trade. The dialect center of Kituba was Manianga, a focal point in the trade routes which came from the upper Congo basin and which separated at Manianga to various coastal ports from Angola to Gabon. Kituba evidently flourished for more than 300 years with only minimal linguistic influence from the outside, for white traders were strongly discouraged from penetrating inland.

It was only toward the end of the 19th century that there was any significant linguistic influence from speakers of French, English, or Portuguese, but by that time the Kituba pidgin was well established among the various tribes in the Lower Congo and became a natural means of communication with Whites from the outside. The white traders and administrators, of course, appreciated Kituba, for it permitted them to communicate with a minimum of effort, since Kituba was so much simpler than the tribal tongues, and with a maximum audience, for the Kituba was widely used. It is little wonder, therefore, that Kituba received considerable governmental sanction and later became one of the four more or less official languages of the Congo, alongside Lingala, Swahili, and Tshiluba.

A number of theories as to the origin of Kituba have been suggested. Some persons claimed that it had been introduced in the early days by the Portuguese. Others insisted that it was a Congolese response to the linguistic inadequacies of white administra-

² Some of the more important treatments of pidgins and creoles include the following: Broomfield (1930), Jacobs (1932), Hall (1944, 1948, 1952, 1961, 1966), Cole (1953), French (1953), Nida (1955), Samarin (1955), Taylor (1956), Voorhoeve (1957), Berry (1959).

³ For data on Kituba see Fehderau (1967).

tors. Still others insisted that missionaries had invented the language, largely through the corruptions which they introduced into Kikongo, the local tribal language; and still other persons contended that Kituba was only the natural result of a linguistic 'melting pot' throughout the area wherever a number of different Kikongo dialects came into contact. As Fehderau has pointed out (1967), none of these theories as to the origin of Kituba can be justified. The only valid explanation is that Kituba is a typical pidgin language, arising as all pidgins do, namely, in the practical circumstances of people from different language backgrounds attempting to communicate with one another. Kituba is also typical in that it represents essentially one basic form of language, the dialect of Kikongo as spoken in the Manianga area. Moreover, it is fully understandable how such a trade center would provide the dominant linguistic form, since speakers of this dialect would be the continuing initiators of communication with the various traders who would come to and through Manianga.

Kituba reflects the modifications characteristic of all pidgins. It is not merely a simplified form of standard Kimanianga, but a form of speech which is mutually unintelligible with Kimanianga and the other Kikongo dialects of the area. The following features of this simplification process are significant: (1) The prefixal aspect-tense forms are drastically reduced. In Kimanianga there were about seventeen of these forms, but in standard Kituba today there are only nine aspect-tenses and these are formed by means of free particles, which form analytic verb phrases rather than tightly knit morphological units of a synthetic type. (2) The subject prefixes to the verbs are replaced by independent pronouns. (3) The noun classes, with six alliterative prefixes in the plural forms, are reduced to four non-alliterative prefixes. (4) The immediate past perfect, which in Kikongo has a complex morphophonemic structure,

has been replaced by a simple verb phrase. (5) The tonal distinctions, which are quite important for the syntactic structure of Kikongo, are greatly simplified. There has been no special simplification in the phonological structure of segmental phonemes, for the phonological structure of Kimanianga was similar to the surrounding related dialects and actually simpler than other languages (adjacent to the Bakongo tribes) whose speakers learned Kituba.

Kituba is now in the process of becoming a creole, since there are now many speakers for whom Kituba is their only or principal language. Creolization, however, means very rapid reversal of some of the very structures which are characteristic of a pidgin. A new class of verbs has arisen in the western region, consisting of French borrowings; and the free forms of the verb phrases are rapidly being reduced to affixal structures. For example, the oldest generation will use *munu imene kwenda* *I have gone*, while the middle-aged generation says *munu mekwenda*, and the young people say *mumekwenda*. If this tendency continues (and there is every indication that it will), another generation will see a complete reversion to an affixal structure, similar to what occurs in Kikongo.

2. Speakers of standard Motu,⁴ a Melanesian language, live in twelve villages near Port Moresby on the south coast of Papua. There is some speculation that these Motu speakers are relatively recent arrivals on the mainland of Papua, since the people do not possess much land behind their coastal villages. At any rate, the Motu people either preferred or were forced to engage extensively in commerce, and in the process they succeeded, in cooperation with their trading partners, in developing a pidgin form of the Motu language, which now extends

⁴ Most of the data of this section is derived from Wurm (1964). Supplementary information was furnished by Mr. H. Brown, for many years a missionary among the Toaripi of Papua.

for several hundred miles to the east and to the west of the Motu area proper.

This pidgin form of Motu spread in precolonial times, but it was seemingly very much aided by Sir Hubert Murray, the first governor of the region, who was so bitterly opposed to Neomelanesian pidgin English that he encouraged the use of pidgin Motu, apparently as the lesser of two evils. At any rate, pidgin Motu became known as Police Motu, for it was adopted as the language of local police and army units and was encouraged by some of the missions in the region. At present, however, only some 60,000 persons speak Police Motu, and then only as a second language. In fact, in the Motu villages usually only the men can speak Police Motu, for they are the only individuals having any special need for it. Moreover, in view of the rapid inroads of Neomelanesian (English pidgin), of which there are more than 800,000 speakers, Police Motu is definitely on the decline, and will probably die out, even as many other pidgins have in the past.

Police Motu, however, is definitely a pidgin language, and not a koiné. Even though the vocabulary of Police Motu is at least 90 percent derived from Motu, the two languages are by no means mutually intelligible. Of course, the Motu speaker will recognize some of the words and he might 'get the drift' of a conversation, but he would find it quite impossible to comprehend what was really being said, for as in the case of all pidgins the structure of the dominant language has undergone certain very severe modifications.

In the first place, the relatively complex verb structure of Motu is drastically simplified in Police Motu. This has meant that only one form of the verb, the third person singular, is selected as the base for all the analytic phrases. In the second place, instead of complex person-aspect-tense complexes preposed to the verb, the pronominal elements are represented by independent pronouns and the aspect-tense elements

become independent particles (often adverbs). These pre-verb structures in Motu are quite complex and involve a number of morphophonemic alternations. It is not strange, therefore, that they have been ready candidates for restructuring into simpler combinations. For example, in Motu *asina itamu I did not see you* (sg.) consists of a pre-verb *asina*, a fused pronominal element of the first person singular with the negative past-tense marker, and *itamu*, the root *ita-see* with the object second person singular suffix *-mu*. In Police Motu all of this has been restructured as *oi lau itaia lasi*, literally *you I see not*.

The interaction between the dominant language and the local language in the process of formation of a pidgin may be readily seen in the influence of Toaripi upon Police Motu. In standard Motu the future is indicated by a preverb structure, marked by an initial *b-*. In Toaripi, however, the future is characteristically indicated by a particle *aite*, meaning *later*, and occurring between the pronominal subject and the main verb. Speakers of Police Motu do not, however, use *aite*, but employ the Motu word *dohore*, also meaning *later*, with this same future significance and in the same position which it would have in Toaripi. Similarly, in Toaripi completed action is indicated by a post-verb expression *roroka*, meaning *that's finished* or *that's the end*. Accordingly, in Police Motu speakers use the Motu word *vadaeni*, which has the same meaning in isolation as Toaripi *roroka* and place it at the same point in the verb phrase as the Toaripi counterpart would be employed.

In addition to these important structural modifications Police Motu also undergoes a complete loss of irregular verb forms and a rather important series of phonological reductions. For example, the Motu voiced velar stop and continuant fell together, and similarly /l/ and /r/ were reduced to a single phoneme. Complex patterns of stress alternation, which in Motu signals dif-

ferences between singular and plural in a number of words, was lost entirely.

3. To note the kinds of restructuring which occur in the processes of pidginization is all very interesting, but what is significant is the nature of such changes, as they reflect certain basic factors in communication. In the first place, a high percentage of changes occurring in pidginization of languages are directed toward greater redundancy. Free pronouns, rather than affixal forms, result in a longer stretch of sound to signal the same amount of information. Similarly, the use of independent adverbial particles, rather than inflectional forms, to denote various tenses and aspects points in the same direction of greater redundancy. In the second place, the simplification of structures, e.g. elimination of morphemic alternations, reduction of grammatical classes, and preference given to single unaltered forms of lexical units (i.e. with inflectional modifications reduced to a minimum or eliminated entirely) suggests the attempt to improve the efficiency of decoding for the person with strictly limited experience in the dominant language. By always hearing only one form of any lexical unit, the receptor can much more readily identify it, since the 'search procedure' in his memory is so greatly simplified.

These two companion procedures of preference for longer free forms and unitary symbolization of lexical units are constantly at work in all languages, pidgin or standard. When procedures of formal coalescence seem to have progressed too far, as, for example, in the verb inflection of Classical Latin, there is a tendency to substitute free forms in phrase structures, as in the case of Romance developments of the future and the perfective tenses. At present, the future of French and Spanish is undergoing a still further analytical development by the introduction of periphrastic forms with verbs meaning 'to go'. At the same time, analogical formations tend to level out some of the com-

plex morphophonemic alternations which develop within linguistic units, so that from time to time such units are restructured in the direction of single rather than multiple forms.

4. On the basis of what we know about the problems of intercommunication between persons attempting to overcome rather formidable linguistic barriers, we can readily reconstruct the major outlines of what actually occurs in the development of pidgin languages. In reality there is no special mystery about the ways in which pidgins arise—they are simply the normal and easily predicted reactions to special sets of circumstances. To understand what happens we need to look at this process first from the standpoint of the speaker of the dominant, or 'source', language and then from the standpoint of the speaker of the nondominant, or what may perhaps be better described as the 'feedback', language.

In describing the role of the dominant language, we might use the designation 'aggressor' language, for this is the language of the one who generally takes the initiative in establishing contact and who provides the basic linguistic material out of which the resulting pidgin is constructed. We could also speak of the nondominant language as the 'reactor' language, to emphasize the function of the receptors. However, the terms 'source language' and 'feedback language' are probably more satisfactory in view of the various types of contexts in which the names need to be used.

In a specific, concrete situation in which speakers of a source language wish to develop communication with persons who do not understand the source language or who have only a very limited knowledge of it, the following procedures will almost inevitably be followed: (1) the source-language speaker will use the simplest and fullest possible free forms to identify (a) objects to which he can point, e.g. fish, nets, shells, axes, pieces of money, ivory tusks, baskets of betel nuts,

(b) events which he can demonstrate or mimic, e.g. *buy, sell, carry off, eat, and drink*, and (c) quantities which he can show, e.g. *one, two, three, much, and little*; and (2) the source-language speaker will then attempt to put these three classes of terms into the simplest possible syntactic constructions, normally following the structure of his own language.

At this point, however, there is almost immediate influence from the feedback language, for the speakers of the feedback language inevitably exhibit two important tendencies. First, they tend to reproduce the words with certain phonological changes, depending on the structure of their own language. If the source-language speaker really wants to do business, he will usually adjust his pronunciation of words in order to accommodate the sounds to the phonological structure of the feedback language. Furthermore, even in the incipient bargaining that takes place in initial contact, the speakers of a feedback language are likely to reorder the words on the basis of the syntax of their own language. Again, the source-language speaker is very likely to shift to this order, for he wants to make his point as effective as possible.

As communicative contacts continue between speakers of the source language and the feedback language, speakers of the latter will acquire more and more of the vocabulary of the source language, but without the elaborate grammatical structure into which it fits. They will almost inevitably, therefore, fit this vocabulary into their own syntactic structures, but as isolated free forms, not as bound forms. What occurs is 'translation borrowing', i.e. borrowing of lexical items from the source-language but with meanings and usages distinctive of the feedback language. The speakers of the source language normally do not object to such modifications of their own language, for the motivation of commercial advantage prompts them to forego any strong emotional feelings based on puristic ideas they might have about their

mother tongue. Moreover, being the aggressive parties in the transactions and having in general a sense of security about the superiority of their own culture, they do not hesitate to speak this 'debased form' of their own language, for they attribute all of this to the cultural 'inferiority' of those who speak the feedback language.

For those who speak the feedback language there is usually an important prestige value in being able to do business in the pidgin. The first men to learn the pidgin are usually the more progressive members of the community and they become the pacesetters. In view of the fact that speakers of the feedback language normally do not go to live with speakers of the source languages, there is no pressure to learn the standard forms of the source language. Moreover, members of the source-language community usually are not too anxious for other people to learn their language in its correct form. This means that pidgin serves an additional function of making people available, when their presence or help is required, but also of keeping them at a distance when one does not wish to be bothered. In other words, speakers of a feedback-language who have acquired the use of a pidgin are economically useful while not being socially threatening.

The ambivalent role of a pidgin is well illustrated in the traditional value of Chinese-English pidgin. As Hall has pointed out (1966, p. 8) the early English merchants in points such as Canton regarded learning 'heathen Chinese' as quite impossible and hence were only too happy to simplify their own language for the benefit of the Chinese. At the same time, the Chinese did not wish to stoop to learn the real language of the 'foreign devils,' but thought this pidgin form of language much less debasing to themselves. Hence, this form of pidgin served the interests of both parties in keeping one another at arm's length. All this, however, was changed with the introduction of western forms of education into China. Persons aspiring to learn about the outside world

wanted the standard forms of English and persons who really wanted to do business in China found that pidgin was simply not enough. As a result pidgin rapidly became merely a symbol of the domestic servant and the poor factory worker, and soon largely ceased to exist, though at one time it was perhaps more widely used than any other pidgin of which we have record.

Because of the special nature of pidgin languages they may arise very quickly—they can be the creation of only a few days or months—when the communication factors are just right. At the same time, however, they can disappear almost as quickly, whenever the circumstances which gave rise to them have radically changed.

5. The koiné form of a language presents no such structural break as is clearly present in the case of pidgins. Koinés are always mutually intelligible with at least some forms of the standard language. Of course, one who knows only a koiné form of a language would find it difficult to understand the high-flown language of traditional literature, but an uneducated speaker of the standard form of the language would likely have a similar degree of difficulty.

Perhaps one of the most interesting koiné developments in language at the present time occurs in Swahili, which spread from the East Coast of Africa inland through major parts of Kenya, Uganda, Tanzania, and Eastern Congo. One may actually distinguish two principal levels of koiné development. First, there is the simpler language used in interior Tanzania, Kenya, and slightly more of a tendency to koiné structures as one moves from Tanzania, to Kenya, and then on to Uganda. Nevertheless, all these forms of Swahili can be roughly classified as East African Swahili, but of a simpler variety than one encounters among educated persons in Dar es Salaam and Zanzibar.

The second koiné area includes the central and southern parts of eastern Congo and Bukavu. The inhabitants of Albertville (now

Kalemie) speak a form of Swahili which most closely approximates the form of language used in East Africa, but from Albertville south the Swahili takes on a distinctive koiné structure, in which verb forms are analogically regularized, noun classes are simplified, and syntactic structures become progressively less complex. A further development of Swahili involves a pidginization, Kingwana, which is much despised by some educational authorities and often strongly denounced by mission leaders, but which still persists, especially in the rural areas considerably to the north of Albertville. In Kingwana the verb structures are radically simplified, the noun classes have almost disappeared, and the sentence structures are very limited.

Congo Swahili as spoken in the area of Lubumbashi has been regarded by some persons as a pidgin and therefore as something to be condemned. There are, however, two very important differences which mark the status of Congo Swahili as a koiné, and not as a pidgin. First, Congo Swahili is mutually intelligible with the form of Swahili as spoken and understood in rural Tanzania; and second, speakers of standard Swahili do not shift their language completely when they attempt to communicate with Congo Swahili speakers. They may choose to employ less complex grammatical structures, but they do not radically modify their speech. They may recognize certain dialect differences, such as may occur, for example, in different dialects of French, but they certainly do not regard Congo Swahili as a foreign language.

In the case of a pidgin language this total shift in manner of speaking is almost always clearly evident. On a recent occasion in Mount Hagen, New Guinea, Nida noticed how an Australian government official was attempting to communicate with one of the servants at the hotel. He first addressed the servant in standard English, on the assumption that he might be a school graduate and should be given the opportunity to respond

in proper English. When the servant obviously did not understand, the official rephrased his communication in simple English to which the servant again gave no response. At that point, the official adopted an entirely different attitude, complete with distinctive intonation, and facial and hand gestures, and began to speak Neomelanesian. A shift from English to French would not have brought out any more striking differences. At last the servant reacted, as though only then had he really been addressed in meaningful forms.

The two levels of koiné development in standard Swahili represent really two different dialects of the same language. Only Kingwana is a pidgin development. The different koiné forms of Swahili reflect the same types of modifications which occurred in Ancient Greek as it spread through the Eastern Mediterranean regions, in English as it has developed distinctive forms in the Philippines, and in Portuguese as it has evolved in Brazil.

The Lingala language of Congo should also be classified as a koiné. As it spread from its up-river origin, it underwent a series of analogical simplifications and regularizations. But speakers of Lingala could always understand one another, even though they could detect certain regionalisms. The furthest extension of Lingala has been to Kinshasa, where it has largely taken over as the trade language of the capital city. At present, probably half of the speakers of Lingala live in Kinshasa or nearby, and due to the importance of Kinshasa in the life of Congo this distinctive Kinshasa form of Lingala is beginning to play a dominant role in influencing the up-river form of the language.

In reality koiné forms of language are much more common than pidgins. In Africa, for example, there are a number of languages which are undergoing modifications as the result of their being used as trade languages by persons of nearby tribal groups. Languages such as Bambara and Hausa in West Africa are particularly important as trade

languages, but there are many less conspicuous languages which exhibit koiné tendencies as the result of their extensive use in bilingual contexts, e.g. Tshiluba and Yaounde.

Though traditional colonialism, which spawned a number of pidgin forms of language, is largely an institution of the past, it would be quite presumptuous to think that future circumstances would not provide settings for the development of new pidgins. Of one thing we may be sure, however, the pressures of multilingualism throughout the world will most certainly give rise to many more developments in the direction of koiné forms of languages, especially in a continent such as Africa.

6. In most situations there is one of three different types of languages in use: (1) international (so-called world) languages, e.g. English, French, and Spanish, which are used in countries of various nationalities and accepted as vehicles of communication in international affairs; (2) national languages, e.g. Polish, Dutch, and Greek, which are used as vehicles of communication within a given country; and (3) ethnic (or regional) languages (or dialects), e.g. Welsh, Kikongo, Zulu, and Cree, which serve as vehicles of communication for more restricted groups within a given country.

When people speaking mutually unintelligible languages come into social contact with each other, one of four main responses can take place: (1) each group rejects the language of the other group as a means of verbal communication; (2) a third language acceptable to both is chosen to be the means of communication; (3) one group accepts the language of the other group; or (4) a 'compromise' is reached by drastically restructuring the language of one of the groups to create a new vehicle of communication acceptable to both.

The languages involved in (2) and (3) (by mutual acceptance) and in (4) (through restructuring) constitute what are called 'trade languages'. The differences between these re-

sponses to a contact situation are not so much a matter of kind as of degree. In (4) there is a great deal of linguistic change involved, but even the outright acceptance of a major world language, for example, as a vehicle of communication by people of another country (such as the use of French in government, education, and business in the Congo) does not preclude linguistic change, a certain amount of restructuring, and the development of regional dialects of the world language. In fact, such changes are bound to take place.

It seems helpful to recognize four degrees of response to language contact. In the past, a great deal has been said about C (below). Nothing more need be said about A, but we feel that it is useful to distinguish and isolate B and D.

A. The aggressor language is accepted with very little or no linguistic change.

B. The aggressor language is accepted with some accompanying widespread modifications but without loss of mutual intelligibility. The resulting language can be called a koiné.

C. An international aggressor language undergoes drastic linguistic change in contact with a local reactor language. The resulting language can be called, for lack of a better name, a 'hybrid pidgin'.

D. A regional or ethnic aggressor language undergoes drastic linguistic change in contact with other regional or ethnic reactor languages. The resulting language can be called an 'indigenous pidgin'.

Koinés are distinguished from pidgins in that pidgins are mutually unintelligible with the originating aggressor and reactor languages while koinés remain largely mutually intelligible with the originating form.

World languages, national languages, ethnic languages, and koinés can be the primary, secondary, or tertiary language of certain groups of speakers. Pidgins, by definition, are never primary languages, i.e. no one calls a pidgin his 'mother tongue'. If a pidgin develops into a primary language for

a segment of the population it is called a creole, and creolization means fairly rapid linguistic change, as the vocabulary and grammar of the language are elaborated.

Following the above framework, one can see how the same language can undergo different developments in different areas: Swahili spreads as a koiné (with slight linguistic modifications and continued mutual intelligibility) in Kenya, Tanzania, and most of Eastern Congo. But it develops as a pidgin (Kingwana) in the northern area as it undergoes drastic changes.

Kikongo is drastically reduced in the Lower Congo to a pidgin Kikongo (Kituba) by native traders and is used as such for decades. Then it spreads (koiné-like) to other areas to the east (actually far into the Kasai in the early days of this century). This same Kikongo base (the Kimanianga dialect) is taken by the Protestant missions of the area and used for teaching, preaching, Bible translation, and vernacular literature, thus creating what is today a church koiné Kikongo, which has spread throughout the Bakongo area. The Roman Catholic church has done the same with the Kintandu dialect of Kikongo.

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SOME FOOD PLANT NAMES IN THE NIGER DELTA

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One of the first people to explore the linguistic diversity of the Niger Delta was Hans Wolff. In the year 1953-4, which he spent in Nigeria under the auspices of UNESCO, he worked out tentative phonologies, serving as a basis for suggested alphabets, for a number of Delta languages which had never previously been studied by a linguist. The short wordlists he collected at that time¹ show the diverse genetic groupings of the Delta languages but, in addition, a considerable amount of common cultural vocabulary, resulting from intimate contacts between the different peoples of the Delta over a period of centuries. Such cultural relationships—explored by Hans Wolff in several papers²—will be investigated here through an examination of one particular area of cultural vocabulary, that of food plant names. The focus will be on the Ijò-speaking peoples, who occupy the lower parts of the Delta, but their inland neighbours will also be considered.

There is an important geographical difference in the Delta between the saltwater area, in which only the most limited kind of agriculture is possible, and the freshwater area, in which agriculture flourishes. Correspondingly, there is a basic cultural distinction between the peoples who live primarily by fishing and secondarily by trade (this includes all the saltwater peoples and a few of the freshwater groups), and those who

live mainly by agriculture, with both fishing and trading being of secondary importance.

In the following list of languages and dialects considered here, the saltwater peoples are indicated by S; the numerals which precede each name summarize the genetic relationship and are used in the tables of forms in the Appendix.

LANGUAGES AND DIALECTS INCLUDED³

KWA BRANCH OF NIGER-CONGO

1. Izi-Úkwuani group (i.e. the group that includes Igbo)

11 Úkwuani	Midwestern State
12 Aboh	Midwestern State
13 Ogba	Rivers State
14 Èkpèyè	Rivers State
15 Ikwerè	Rivers State

2. Èdo group

a. Southern Èdo

21 Urhobo	Midwestern State
22 Isoko	Midwestern State

b. Delta Èdo

25 Degema	Rivers State
26 Engenni	Rivers State
27 Epie	Rivers State

3. Igala-Itsekiri group (i.e. the group that includes Yoruba)

31 Itsekiri	Midwestern State
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4. Ijò cluster

a. Northeastern dialects

411 Kalabari	S	Rivers State
412 Okrika	S	Rivers State
413 Nkporo	S	South-Eastern State
414 Ibanì	S	Rivers State

(Bonny)

³ The classification given is essentially that in Greenberg 1963, modified for the Benue-Congo section by Williamson (in press). For further details on the languages and dialects included here, see Williamson 1968a. For Úkwuani, see Williamson 1968b; for Delta Èdo, see Thomas and Williamson, 1967; for Abua, see Gardner 1966 (not tone-marked). I am indebted to Mr. B. O. W. Mafeni for the Isoko forms, Mr. J. Kelly for the Urhobo forms, Mr. and Mrs. D. Clark for the Èkpèyè forms, and Mr. E. K. Kpagane for the Kana forms; others are taken from unpublished wordlists, etc., available in the Department of Linguistics and Nigerian Languages, University of Ibadan.

¹ Some of these were later published in Wolff 1959b, 1964; in addition typescript copies of the following are preserved in the Department of Linguistics and Nigerian Languages, University of Ibadan: Kana (Ogoni) orthography; Gokana (Ogoni) orthography; Eleme orthography; Kalabari orthography; Notes on the orthography of Nembe, Akassa and Upper Ijaw; Epie-Atissa (Yenagoa) orthography; Abua orthography.

² Wolff 1959c, 1967.

- b. Southeastern dialects
 - 421 Nembe S Rivers State
 - c. Northeast-Central dialects
 - 441 Amegi Rivers State
 - 442 Okordia Rivers State
 - d. South-Central dialects
 - 461 Boma Rivers State
 - 462 Olodiana Rivers State
 - 463 Oporoma Rivers State
 - e. North-Central dialects
 - 471 Kolokuma Rivers State
 - f. Northwestern dialects
 - 481 Kabo Midwestern State
 - 482 Mein Midwestern State
 - g. Southwestern dialects
 - 491 Arogbo Western State
 - 492 Iduwini S Midwestern State
- BENUE-CONGO BRANCH OF NIGER-CONGO
- 5. Abua-Ogbia group
 - 51 Abua Rivers State
 - 52 Ogbia Rivers State
 - 6. Efik-Andoni group
 - 61 Andoni S South-Eastern State
 - 7. Ogoni group
 - 71 Kana Rivers State

To this day, the saltwater peoples are not agriculturalists to more than a very meagre extent. In Kalabari the growing of food plants in general and yam in particular has even been traditionally taboo, although the prohibition is losing force nowadays.⁴ For a long time the saltwater peoples have obtained almost all their foodstuff supplies from their inland neighbours, to whom they sell fish in exchange. One question that arises is, therefore, how they lived before the inland trade was developed. Oral tradition suggests that their economy was, at this early period, essentially a hunting (or rather fishing) and gathering one:

"What this people used to eat then was a fruit called . . . mgbusú, which is a fruit from the wine-palm, fish and dried bush meat—these made up their food; there was no food that was planted from the soil, they didn't eat any; they did not see any either."⁵

⁴ Personal communication from Professor Robin Horton.

⁵ From: The history of Ogoloma (Okrika), text LXXXIX, lines 120-123; recorded by E. J. Alagoa and transcribed and translated in the Department of Linguistics and Nigerian Languages, Ibadan.

It is significant that the fruit mentioned here, mgbusú, is the fruit of the WINE or RAPHA PALM (*Raphia hookeri* Mann & Wendl).⁶ The fruit is not much eaten nowadays,⁷ but the Ogbia and Southern Ijo still use it and it figures in the ritual for the Ekpe masquerade of Soku (a Kalabari village), where it is said to represent 'poor man's food'.⁴ The tree also yields palm wine (from which gin is distilled in certain areas, especially Southern Ijo), raffia fibre for weaving mats and baskets, midribs of the leaves used in building, a fish poison from the fruit, and the edible larva of the Rhinoceros Beetle (*Oryctes* sp.) from the rotting trunk. 'One of our most useful trees', say the Ijo. There is, therefore, good reason to regard it as an ancient foodplant. (It is not actually cultivated, but it is given protection and is individually owned—unlike the oil palm, which is completely wild and only collectively owned by the community.) Throughout Ijo its name is kóró;⁸ this looks cognate with Izi-Úkwuani á-gwò, Abua-Ogbia ɔ-ýól,

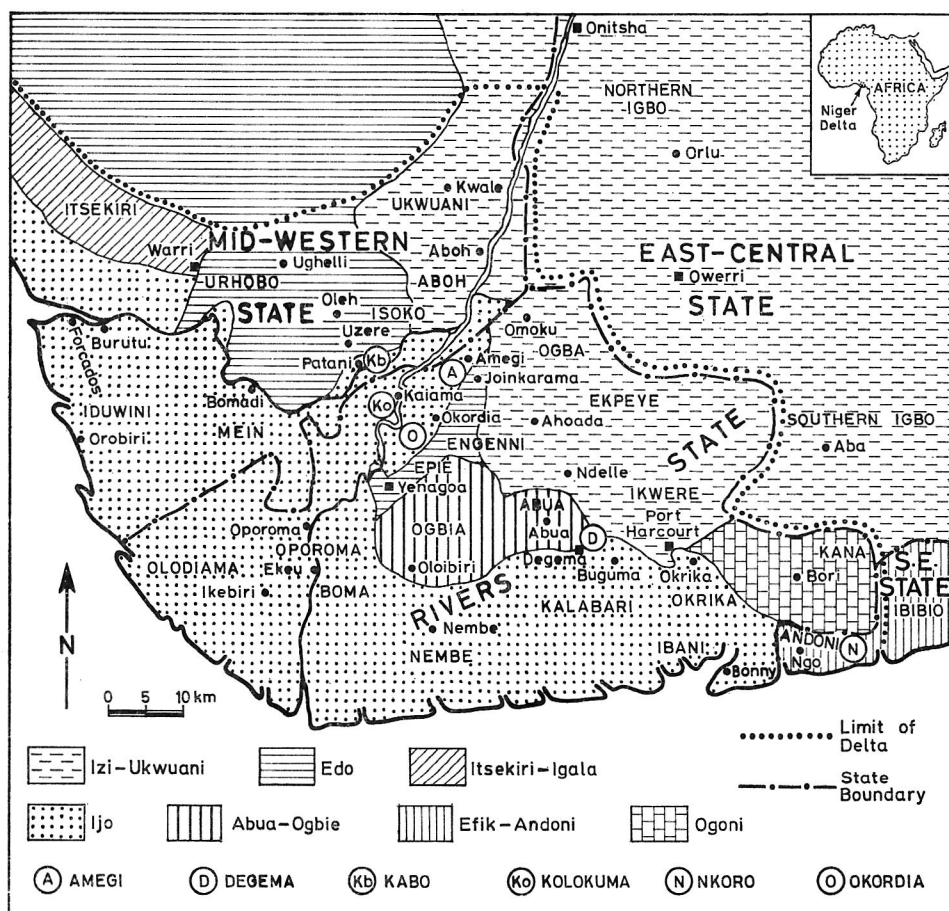
⁶ Botanical names are taken from Dalziel 1948; I am most grateful to J. R. S. Lawton, Botany Department, University of Ibadan, for advice on the identification and naming of some of the plants.

⁷ Before being eaten it must be thoroughly cooked; the raw fruit is poisonous to fishes (though larger creatures such as crocodiles and manatees can survive it). The fruit of *Raphia vinifera*, called boyá by the Kolokuma, biya by the Olodiana, and bou koro by the Nembe, is more widely eaten and is not poisonous.

⁸ In all cases where forms are quoted for groups and not for individual languages, they represent generalizations or 'pseudo-reconstructions' (term introduced by Professor J. Voorhoeve, Leiden) not based on exact sound correspondences (with the partial exception of Ijo). A standard transcription has been used; low tone is unmarked, high tone is marked by an acute accent, mid (in the case of Yoruba, Itsekiri, and Kana) and a downstepped high (in the case of all the others) by a vertical mark. Note that this differs from the normal practice for Yoruba (where mid is left unmarked) and for Igbo and Hausa (where high is left unmarked). Most of the languages have 8, 9 or 10-vowel systems with cross-height vowel harmony (Stewart 1969); exceptions are Kana, Andoni, Urhobo, Itsekiri, and Yoruba.

Efik-Andoni *ú-kədə*, and quite probably the Edo and Ogoni forms as well. The similarity between these forms, while obvious to a comparative linguist, is not close enough to suggest recent borrowing;⁹ it can therefore be

Wordlist¹⁰ shows that this root is also found in a number of Plateau languages, e.g. Kadar *e-kol* (tone?), Ikulu *be-kol* (tone?), Kambari *á-kkúlú*, Reshe *hí-kólú*, and Yergam *in-gur* (tone?).



LANGUAGES OF THE NIGER DELTA

(By courtesy of the Department of Geology, University of Ibadan)

concluded that an original **-kələ* is either a very old culture word or that it extends back to Proto-Niger-Congo. The Benue-Congo

⁹ Note, however, the suspiciously close similarity between Urhobo *əgərə*, Ukwuani *əgələ*, and Aboh *əgələ*, and Isoko *əgələ*. Yoruba *ogurá*, *əgərə* also means 'raphia palm wine'. It looks as if this form, although in origin the ancient root discussed here, has been spreading recently with the meaning 'raphia palm wine'.

It was observed above that the words for RAPHIA PALM, although ultimately related, show clearly distinct forms in the various genetic language groups of the Delta. Other food plant names which are closely correlated with the genetic language groupings are: OIL PALM (*Elaeis guineensis* Jacq.), YAM (*Dioscorea cayenensis* Lam. or

¹⁰ Williamson and Shimizu (edd.), 1968.

D. rotundata Poir), and KOLANUT (*Cola acuminata* Schott & Endl. and *C. nitida* A. Chev.).

	Oil Palm	Yam	Kolanut
Izi-Úkwuani Èdo	-kwó ¹¹ ó-díyè	i-jí o-lé (Southern) a-dí ¹² (Delta)	ó-jí e-foi
Itsekiri-Igala Ìjọ	lugó	ì-cù šuru	ò-bi d'áṣó(yé) ¹³
Abua-Ọgbia	o-d'e	e-d'el	e-gbe
Efik-Andoni ¹³	—	—	—
Ogoni	dyóó	dyiá	gbúí

These plants are among those generally thought to have been first cultivated in West Africa; it may therefore be reasonably assumed that they were known, as a result of gathering, cultivation, or trade, to the speakers of the protolanguages of the various groups.

As far as the yam is concerned, Horton discusses evidence from Kalabari relating to its introduction:

"Both Ke in the Eastern Delta and members of the former Akialame ward in New Calabar claim that their forbears were the first to open up the Ọbia markets [in Ikwere, near modern Port Harcourt] and bring down yams.

"I remember asking an old man in Buguma what people were supposed to have done before this, and he said they got a kind of yam and fruits from the forest.

"But although the eating of hinterland yams is seen as something introduced, ẹuru 'yam' is almost synonymous with eating: viz. ẹuru i tariári 'I am hungry' and ẹuru i

bári 'I am starving'. Again ẹuru is used as synonymous with eating in proverbs and rituals. This would seem to imply ancient standing for the yam.

"One suggestion that might reconcile these two lines of evidence is that the original ẹuru was some sort of wild yam gathered in the considerable tracts of forest scattered over even the saltwater areas of the eastern Delta, and that it was an important item of diet. Then, perhaps, the word was transferred to the superior but recognizably similar products of the hinterland trade."¹⁴

There is, however, another group of plants, including some important staples, whose names are not so neatly correlated with genetic groups. Although they do not, in most cases, cross language boundaries in such a way as to suggest recent borrowing, they are not so widespread that they can be reconstructed to the proto-languages. This is the case, for example, with the COCOYAM or TARO (*Colocasia esculentum* Schott). The Central and Western Ìjọ call it odú, a word which belongs to the class of tonally irregular words into which most loanwords go; it is clear that the word is related to the Southern Èdo ódú (Isoko), and it is possible that both were originally borrowed from the Izi-Úkwuani éde. This would suggest that the cocoyam was first introduced into the Central and Western Delta from Igboland to the north-east.¹⁵ On the other hand, there is another word in the Eastern Delta, okíde (Abua-gbiỌa and Delta Èdo groups), which is perhaps cognate with Kana gééré and the first element of the Nembe name ikere-šurú. The second element of the Nembe form means 'yam', which is an indication that the yam was known to the Eastern Ìjọ before the cocoyam. It also seems likely that

¹¹ The prefix cannot be reconstructed yet.

¹² The Ìjọ forms show some irregularities, which might be due to a second element -yé 'thing' being suffixed, as assumed here, or might reflect irregularity due to borrowing.

¹³ The Andoni forms are not cognate with those in the group which contains Efik, and therefore no reconstructions can be made for the group as a whole.

¹⁴ Personal communication from Professor Robin Horton.

¹⁵ A roughly east-to-west direction for its introduction is suggested by the fact that today the cocoyam is taboo in some northwestern Delta communities—Aboh and parts of Isoko—which are therefore unlikely to have introduced it to areas further south.

the other Eastern Ijò forms kóǝuru (Nkqorq) ikúu (Okrika), etc., are reductions from a longer form like the Nembe one.

This agrees well with the fact that the cocoyam is in origin a plant of Southeast Asia, part of what Murdock (1959) calls the Malaysian complex. Murdock considers that this complex of food plants reached Southern Nigeria within the last two thousand years, diffusing across the continent from Malagasy: others, however, think that they spread through tropical Africa from India and Egypt, in which case they may have been known for longer than two thousand years; thus Blakney (1963) considers that the KO-root for the plantain or banana (which also belong to this cluster) is so widespread that it must be considered Proto-Niger-Congo, which he dates lexicostatistically more than four thousand years ago.

The cocoyam has certainly been cultivated in the Delta for a long time; it is regarded as thoroughly indigenous and no traditions about its introduction are known. In Kolo-kuma it has a festival, odúfí ('Eating of cocoyam'), and it is called ızǝ ódú 'Ijò cocoyam' as opposed to the beké ódu 'European (i.e. imported) cocoyam' (*Xanthosoma sagittifolium* Schott), which has been introduced within the last hundred years.

A similar situation obtains for the PLANTAIN (*Musa sapientum* var. *paradisica* Linn.); ultimately of Southeast Asian origin, it is in some areas of the Delta the most important staple and in Nembe the most important food for ritual purposes. Its names, however, are varied and less easy to relate to one another than those of the cocoyam; this is probably because of the existence of a number of different varieties introduced at different periods. In the Eastern and South-Central Ijò dialects, and in Delta Edo, there is a widespread root afánga, taking the form mbáná in some Northeastern dialects. This is apparently related to [mbíná] in Eket (a language of the Efik-Andoni group) to the east of the Delta, once again suggesting an east-to-west introduction. In the North-Central and Western Ijò dialects there is a root

beribá; both of these roots are irregular enough, in terms of basic Ijò structures, that they appear to be old loanwords. No conclusions can be drawn from the rather miscellaneous words in other languages.

The BANANA (*Musa sapientum* Linn.) is even more difficult. Evidence for regarding it as old in the Delta comes from Nembe oral tradition and ritual: "Now, there is a type of banana called Amakoromq idú. That was their food . . . If he had fish—if he went to fish and even if he caught plenty of fish, he would never eat any other fish. Qkqag-bará, that was the one he used to eat. In the forest, it was duikers and antelopes. If he could not get anything, mullet, that was what he ate."¹⁶ Clearly, this is a similar account to the one quoted earlier, but with the banana instead of the fruit of the wine palm. The account refers to an early period prior to the introduction of the canoe proper, an essential item in Delta culture. Provided it is accurate, the account suggests great antiquity for this particular kind of banana, whose name means 'banana of the founding of the city'. It is used in the Idú festival, a highlight of which is the ceremonial cutting of a banana (ídu).¹⁷ Otherwise, however, the

¹⁶ From History of Nembe, text LXXI, lines 36-40, by Owolo Yousuq, recorded by E. J. Alagoa and transcribed by E. H. T. Gboqatq. I am grateful to E. J. Alagoa for drawing my attention to this reference.

¹⁷ The Idú festival is described in Alagoa 1964. The tonal difference between ídu *banana* (this is in the tone class which is largely composed of loanwords) and Idú is puzzling, and the possibility cannot be completely dismissed that the banana was introduced into an older ritual (the cutting of a mangrove is also involved) because of an accidental similarity of name. In support of this, Horton observes that in the Iju festival at Soku (Kalabari), which seems to offer many parallels to the Idú at Qkpoma, there is no trace of the banana—a plant which has, in Kalabari as a whole, no ritual importance and only marginal food importance. On the other hand, there are a few cases in Nembe of nouns taking different tone patterns when used in an idiomatic sense: e.g. egberi 'story, history' (normal tone pattern), but égberrifí (lit. 'history-speech') 'special kind of distorted speech used in speaking of ancient events'.

banana is a rather marginal food, not much valued or eaten. Several languages designate it the 'European (imported) plantain' or in one or two cases the 'ripe plantain' (both names implying that the plantain was known earlier); others borrow the Igbo name *úle*.

The WATER YAM (*Dioscorea alata* Linn.), which is also of ultimate Southeast Asian origin, is an important crop in some parts of the Delta; in Kolokuma it is the locally-grown yam, called *iyórú burú* 'female yam', whereas the *owéí burú* ('male', i.e. Guinea, yam) is imported from Onitsha. Names for it have not been collected separately from the general term for 'yam'.

Plants of the Malaysian complex are, then, very well established and of basic importance in the Delta. Among the Kolokuma, for example, the only foods exported to other areas in any quantity are cocoyams, plantains, water yams and palm oil; all but the last are Malaysian in origin. At whatever date they arrived in the Delta, they have long been firmly established and (with the partial exception of the banana) are regarded as indigenous. It is possible, in fact, that agriculture only developed fully in the Delta with the arrival of these plants from the north.

The remaining food plants which will be discussed here have a rather different kind of distribution. There is very little correlation of the names with the language groupings; instead, the names spread over wide areas which can sometimes be associated with trade routes and sometimes give an idea of the direction from which the plant was introduced.

A simple example is BITTERLEAF (*Veronia amygdalina* Del. and *V. colorata* Drake). The great majority of the languages under consideration use a word derived from the Igbo terms *olúgbu*, *olúbí*, suggesting strongly that it was introduced from Igbo-land in the relatively recent past. Another indication that it is a fairly recent loan is the fact that in a number of Western Ijò dialects it has apparently been changed by folk etymology into *ológbo cat*—itself a bor-

rowing, presumably fairly recent, from Yoruba; it is then distinguished from 'cat' by being combined with *kirí* 'ground'.

A slightly more complex example is OKRA or OKRO (*Hibiscus esculentus* Lin.). This is apparently an indigenous West African crop, and it is therefore not surprising to find that over the Eastern and Central Delta the normal term is again derived from Igbo *ókuro* (which is perhaps the source of the English word as well). In the Western Delta, however, other terms are found, of which the most widespread is *ikiabú* and the like, derived from Portuguese *quiabo* [ki'abu]. This suggests that the plant was introduced into the Delta from the west later than the arrival of the Portuguese; note the related Bini form *ixiabo*. (Benin, where Bini is spoken, was a major centre of Portuguese influence.) A question then arises about the earlier distribution of the plant in West Africa; was it brought from some parts of West Africa to others by the Portuguese?¹⁸

For the GROUNDNUT or PEANUT (*Arachis hypogaea* Linn.), of American origin, there are three different names; in the extreme Eastern Delta occur forms borrowed from Southern Igbo *ahú ékééré*; in the Central area, there is a form *apapá*, probably originating from Northern Igbo; while in the far Western Delta there is a form *ísáagwegwe*, whose origin is not yet clear. These three forms correlate, very roughly, with peoples whose modern trading patterns normally focus on Port Harcourt, Onitsha and Warri respectively, reflecting the fact that groundnuts, although grown within the Delta to a limited extent, are to a greater extent important from other areas.

A somewhat similar pattern appears for another introduction from America, MAIZE or CORN (*Zea mays* Linn.), although the

¹⁸ English dictionaries suggest that English okra is derived from Twi *ɲkurúmá*; if this, rather than the more obvious derivation from Igbo (first suggested to me by R. G. Armstrong), is correct, the possibility arises that Igbo borrowed from English; furthermore, it then becomes likely that okra was introduced into Nigeria from Ghana by Europeans.

boundaries for the three chief terms do not coincide with those for the groundnut. In the Eastern Delta there is a term *imbrakpá*, etc., whose origin is unclear but which appears to be widespread (Willett 1962). In the northern part of the rest of the Delta, there is a term whose immediate source is Igbo *óká*, and in the Southern part there is a third term, *agbodo*, deriving from Yoruba *agbadó*. Again, a very rough correlation can be made with trading patterns with Port Harcourt, Onitsha and Warri respectively. As with groundnuts, some is grown within the Delta but more is imported.

A rather different pattern appears in the words for CASSAVA or MANIOC (*Manihot utilissima* Pohl). In contrast to maize and groundnuts, this is a crop which is grown locally in large quantities and not imported from other parts of the country. The word most commonly in use is borrowed from Portuguese *mandioca* [mãdi'óká]. The forms which show their origin most clearly are found in the Western Delta, suggesting that the point of entry of both plant and name was there. This agrees with the historical fact that Portuguese relations with both Warri and Benin were close. Itsekiri, which was possibly the first language to borrow the word,¹⁹ has *imidáka*; Southern Ijò dialects change -m- to -mb- (probably because stops are 'stronger' than nasals, and there is a very general tendency in Ijò for 'weaker' consonants not to precede 'stronger' ones). Abua and Ogbià go one step further by dropping the nasal completely and 'strengthening' all the consonants to voiceless stops. The Eastern Ijò forms have retained the m-, treating it as a syllabic nasal, and have introduced a second high tone: e.g. *İbanı́ mpatáka*. The impression that cassava spread from West to East in the Delta is confirmed by the Kolokuma names; one is *abáburú*, which means 'yam (burú) of the

Ọba (abá)', i.e. the Ọba (king) of Benin; another form is *ẹbẹbúru* 'Aboh yam'. Some of the other Ijò names appear to be related to these forms.²⁰

There are several other plants of various ultimate origins which were introduced by the Portuguese and for which the most widespread names are derived from Portuguese. Typical of these is RICE (*Oryza sativa* Linn.), which is known throughout most of the Delta by names deriving from Portuguese *arroz* [a'rros]: *orósi*, *arosi*, and the like. The ORANGE (*Citrus aurantium* Linn. and *C. sinensis* Osbeck) is known throughout most of Ijò and in some neighbouring languages as *alaláfínda*, from Portuguese *laranja* [la'rãza];²¹ where this word is not used, the orange is mostly called by the same name as the LIME (*C. aurantifolia* Swingle) or distinguished as the 'European' lime. The COCONUT (*Cocos nucifera* Linn.) is in most of the Western and Southern Delta called *okokodía* (tree and fruit), which looks like Portuguese *coqueira* [ko'keira] (tree), though the tone and consonant correspondences are irregular; in most other parts the fruit is called the 'European (palm)nut'. The ONION (*Allium cepa* Linn.) is interesting, for it has two widespread names.²² One is from Portuguese *alho* [a'ʎu] 'garlic', occurring as *áyo* and similar forms; this is definitely Eastern in its distribution and suggests an origin from a port such as Bonny. The other derives ultimately from Arabic through Hausa *albása*, but in

²⁰ The trade in one particular kind of food prepared from cassava, a sort of large-crumbed dried food called in local English *farina* (Portuguese 'farinha'), has in the Ijò area always been associated with traders from Iselema (Warri); this is said by the Kalabari to be an ancient trade (Horton, personal communication).

²¹ This origin for the term was suggested to me by Mr. David Clark.

²² The origin of a third name, *utitá*, has not been discovered; Kelly (1969) observes that the Urhobo form is not a canonical one. R. G. Armstrong notes that the Idoma word for ALLIGATOR PEPPER (*Aframomum melegueta* K. Schum.) is similar in sound: *otutá*, but it is difficult to see any relation in meaning.

¹⁹ The first borrowing language is unlikely to have been Ijò, for Ijò morpheme structure rules allow a noun to begin with a consonant; Itsekiri and Urhobo rules do not.

most cases the Delta form, *yabási* or the like, appears to be immediately borrowed from either Pidgin *yabáas* or Onitsha Igbo *yabáasi* (it is not clear which of these is the older form); this name is related to a trade route from the North through Onitsha. Of these four plants, the orange and the coconut are grown locally on a small scale, while rice and the onion are (except for recent Government experiments) entirely imported from outside the Delta.

To summarize, then, this preliminary study of the distribution of food plant names indicates that there are three main layers of names; ancient West African plants, crops of the Malaysian complex introduced long ago, and more recent introductions dating from within the last five hundred years. There are, of course, many other food plants in use in the Delta besides those treated here, and it should be possible to find out whether they fit into the framework here suggested.²³

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APPENDIX

DISTRIBUTION OF NAMES FOR TEN FOOD PLANTS

Languages and dialects are arranged in a schematic geographical order; the numbers refer to the genetic classification at the beginning of the paper. The interplay of genetic and areal relationships can thus be observed. The notes refer mainly to details not treated in the body of the paper.

CASSAVA (*Manihot utilisima* Pohl)

11 imalááka	12 ákpú	13 eča	14 ogbólo	15 íjì ákp ò
21 emedáka	22 egú (a)	441 ɔ́ɔ́rɔ́bɔ	25 úbiaɕuru	71 ázákpòm
	midáka (b)			
31 imidáka, midáka	471 abáburú	442 idaɕɔ	411 mbarakaɕí	412 rjápu
481 ɔkpṹɔ́kɔrɔ́	463 imbitáka	26 eɕɕaɕɔ	51 apitaka	413 mpatóka
482 embadáa	462 imbitaá	27 idɕɔɕɔ	52 éptáka	414 mbatáka
491 ugbágudá	492 mbédára	461 imbridáka	421 ibiabúru	61 ákpúte

12, 15, 61 Cf. Igbo ákpú.

22 (b) Loan from 41, Itsekiri.

52 Ogbia has three forms: old ébdáka, normal éptáka, and finally a form used only by young people in which the cluster is simplified: étáka.

71 Tai dialect.

412 Loan from 15, which is a compound 'cassava yam'.

481 Probably a mistake: this term normally refers to pounded cassava, cf. Onitsha Igbo ákpú nkolo (shredded, pounded) cassava.

COCOYAM (*Colocasia esculentum* Schott: some terms also include *Xanthosoma sagittifolium* Schott)

11 akaši	12 akaši	13 éde	14 éde	15 éde
21 idu (? pl.)	22 ódú	441 odu	25 ukónúrú	71 gèéré (a)
31 kóko	471 odú	442 óyíṣoḍu	411 iku	íde (b)
481 odú	463 odú	26 átóḍíá (a)	51 okoṣo	412 ikúu
482 odú	462 odu	ikíre (b)	52 ókíḍə, okíḍə (a)	413 kóḍuru
491 odú	492 odú	461 oḍú	akwakóá (b)	414 kúu
			421 ikeriḍú	61 íkəṇ
			íkereḥurú	

11, 12 Cf. Onitsha Igbo akasí, which Burkill (1938) suggests is derived ultimately from Greek and Latin *colocasia*.

31 Cf. Yoruba kóko.

52 (a) white, also okíḍə ñeké (presumably *X. sagittifolium*) (b) red.

61 Cf. Ibibio íkəṇ, Efik í-kəṇ.

71 (a) *C. esculentum* (b) *X. sagittifolium* (from Igbo).

442 Presumably *X. sagittifolium*.

471 odú is subdivided: 1. 1zṣ́ ódú (*C. esculentum*) a. white b. ekpéku reddish; 2. beké ódu (*X. sagittifolium*) a. white b. ekúwé odu reddish. Another type is called isélémá ódú 'Warri cocoyam' (reddish, hard).

GROUNDNUT (*Arachis hypogaea* Linn.)

11 iséegwe (a)	12 apapá	13 apapá	14 apapá	15 ahí ékére
apampá (b)				
21 iságwe (pl.)	22 apapá (a)	441 apapá	25 apapá	71 awékéré
	iságwé (pl.) (b)			
31 isáágwé	471 apapá	442 apapá	411 apapá	412 anwékéré
481 apipá	463 apapá	26 (i)papá	51 ɔneekere	413 ahú ókére
482 esáwe,	462 apapa	27 ápapá	52 ápapa	414
eságwegwe				
491 isáwewe	492 iságwéegwe	461 apapá	421 apapá	61 ahákéré

KOLANUT (*Cola acuminata* Schott and Endl. or *C. nitida* A. Chev.)

11 ǫǫ	12 ǫǫ	13 ǫǫ	14 ǫǫ	15 ǫǫ
21 ǫǫ	22 ǫǫ	441 dǫǫ	25 ǫǫ	71 búú
31 ǫbi	471 dǫǫ	442 ǫǫǫ	411 ǫǫ (a)	412 ǫǫ
			ǫǫ (b)	
			ǫǫ (c)	
481 dǫǫ	463 dabio	26 aǫǫ	51 egbe	413 lǫǫ
482 dabǫǫ	462 dabiye	27 aǫǫ	52 egbe	414 dǫǫ
491 dabiyo	492 dabo	461 ǫǫǫ	421 ǫǫ	61 ǫǫ

The roots of some of the languages looked related; e.g. Itsekiri-Igala ǫbi and ǫdo ǫǫ; cf. also Gwari (Nupe group) ebyí, Ufia (Cross River 3) rǫ-ǫ, suggesting an old root -ǫi or the like; the Ogoni and Abua-ǫǫ forms may also be related.

411 (b) Loan from Igbo; (c) loan from Hausa ǫǫ.

MAIZE, CORN (*Zea mays* Linn.)

11 ǫká	12 ǫka	13 ǫká	14 ǫka	15 áhǫká, ikpa
21	22 ǫká	441 ǫká	25 ǫbrǫká	71 kǫkpa
31 ǫmǫ	471 aká	442 aká	411 mǫbrǫká	412 ǫbrǫká
481 aká	463 agbodo	26 áka	51 ǫbrǫká	413 akǫkpa
482 ǫká	462 agbodo	27 aká	52 evǫká	414 mǫbrǫká
491 agbodo	492 agbodo	461 agbodo	421 ǫbrǫká	61 akǫkpa

For ǫka and similar forms, cf. Onitsha Igbo ǫká, Bini ǫka; also Yoruba ǫka *guineacorn, maize*, ǫka agbodo maize. For nasalized forms, cf. Orlu Igbo ǫká.

For agbodo, cf. Yoruba agbadó.

With 71 cf. Tai dialect áǫpákira, Gokana kǫkpa.

ONION (*Allium cepa* Linn.)

11 áǫbǫsa	12 áǫbǫsa	13 áǫ	14 áǫ	15 ayo
21 utita	22 útítá (a)	441 yabási	25 áǫ	71 áǫ
31 útútá	áǫbǫsa (b)			
	471 yabási	442 áǫ	411 áǫ	412 áǫ
481 yǫbási	463 áyo	26 áyoú	51 ayo	413 áǫ
482 yabási (a)	462 áyo	27 ayabási	52 óyo	414 áǫ
ǫyǫs (b)				
491 alubása	492 atuta	461 áyoú	421 áyo	61 áyo

482 (b) From English *onions*.

491 From Yoruba alubása (from Hausa).

OIL PALM (*Elaeis guineensis* Jacq.)

11 ékú	12 ákwó	13 ékwó	14	15 vókwú
21 órié	22 óriyé	441 ló	25 edí	71 zòò
31 ogboroge	471 líf	442 ló sɪ	411 énéme	412 kóró énémi
481 léf	463 ló	26 édí	51 ɔte	413 díme
482 lóú	462 loyɔ	27 edi	52 ɔde	414 díń
491 loyɔ	492 loyɔ	461 díú	421 logó	61 kóo

442 Oil palm tree

PLANTAIN (*Musa sapientum* var. *paradisiaca* Linn.)

11 únée	12 úne	13 ál'ekwó	14 ɪden(ɪ)	15 ókwómá
21 ɔrhe	22 úbyéré	441 abínáa	25 ɔbláí gasi	71 ka ábue
31 á'táá	471 beribá	442 ɓeribáa	411 mbáná	412 mbíná
481 biréé	463 abána	26 abína	51 ad'akaá	413 obiɔ
482 beribe	462 abaná	27 abaná	52 ɔfóí	414 ɪyaũ
491 beiba	492 beribɔ	461 abánáa	421 ábangá	61 efíɔŋ a kr

13 = ál'ekwó never sheds leaves.

71 native banana.

WINE PALM (*Raphia hookeri* Mann and Wendl.)

11 ɔgɔɔ	12 ɔgɔɔ	13 ńgwɔ	14	15 ńgwɔ
21 ɔgɔɔ	22 ɔgɔɔ	441 ɓóyé	25 ńgwɔ	71 kúé
31	471 kóró	442 kóró	411 kóró	412 ɪru kóró
481 kóró	463 kərə	26 ɔkwei	51 ɔyɔl	413 kóró
482 kóró	462 kərə	27 ukɔ	52 ɔyɔl	414 ɔdɔ
491 kərə	492 kərə	461 kərə	421 kərə	61 ńgɔɔ

25 Probably a loan from 15.

412 Wine kərə

441 Probably a mistake; this is normally the name for *Raphia vinifera* (cf. footnote 7 above).YAM (*Dioscorea* spp.)

11 ɪjí	12 ɪjí	13 ɪjí	14	15 ɪjí
21 ɔné	22 ɔlé	441 buru	25 ogb'ó	71 zíá
31 ɔrúsú	471 buruú	442 ɓuru	411 ɓuru	412 ɓurú
481 burú	463 burú	26 ed'ia	51 etel	413 ɓuru
482 buru	462 buru	27 ad'ia	52 etel	414 ɓuru
491 buru	492 buru	461 ɓurú	421 ɓurú	61 úkwá

CONFERENCE ON SALISH LANGUAGES

The Fifth Conference on Salish Languages will be held at the Pacific Northwest Indian Center, Gonzaga University, Spokane, Washington, August 17-18, 1970. Papers on Salish, Wakashan, and neighboring Northwest languages are welcome. Write Thom M. Hess, Dept. of Linguistics, University of Victoria, Victoria, B.C., Canada.

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